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S. Hrg. 99-217 Pt. 4

Senate Hearings

Before the Committee on Appropriations

COMPLETED

MF718

ORIGINAL

Department of Defense Appropriations

Fiscal Year 1986

99*th* CONGRESS, FIRST SESSION

H.R. 3629

PART 4—(Pages 1–460)
NONDEPARTMENTAL WITNESSES

2

S. Hrg. 99-217 Pt. 4

DEPARTMENT OF DEFENSE APPROPRIATIONS FOR FISCAL YEAR 1986

HEARINGS

BEFORE A

SUBCOMMITTEE OF THE

COMMITTEE ON APPROPRIATIONS

UNITED STATES SENATE

NINETY-NINTH CONGRESS

FIRST SESSION

ON

H.R. 3629

AN ACT MAKING APPROPRIATIONS FOR THE DEPARTMENT OF DEFENSE FOR THE FISCAL YEAR ENDING SEPTEMBER 30, 1986, AND FOR OTHER PURPOSES

PART 4—(Pages 1-460)

Nondepartmental Witnesses

Printed for the use of the Committee on Appropriations

U.S. GOVERNMENT PRINTING OFFICE
43-740 O WASHINGTON : 1986

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DEPARTMENT OF DEFENSE APPROPRIATIONS FOR FISCAL YEAR 1986

TUESDAY, MARCH 19, 1985

U.S. SENATE,
SUBCOMMITTEE OF THE COMMITTEE ON APPROPRIATIONS,
Washington, DC.

The subcommittee met at 10 a.m. in room SD-192, Dirksen Senate Office Building, Hon. Ted Stevens (chairman) presiding.

Present: Senators Stevens, McClure, Kasten, Rudman, Proxmire, and Chiles; also present, Senator Sasser.

NONDEPARTMENTAL WITNESSES

OPENING STATEMENT OF SENATOR RUDMAN

Senator RUDMAN [presiding]. Good morning.

The chairman will be delayed a bit so I will start the hearing. We have a rather full day today.

Today the subcommittee will receive testimony on the fiscal year 1986 defense appropriations bill from witnesses outside the Department of Defense.

On behalf of the subcommittee membership I want to welcome all witnesses this morning. In order to accommodate everyone who wishes to testify, we ask you to summarize your statement in 10 minutes or less and file your written testimony for the record. Your testimony will be published as part of the subcommittee hearing record this year.

Our first witness this morning is Father T. Byron Collins of Georgetown University.

GEORGETOWN UNIVERSITY

STATEMENT OF REV. T. BYRON COLLINS, SJ, SPECIAL ASSISTANT TO THE PRESIDENT, GEORGETOWN UNIVERSITY

ACCOMPANIED BY OREN FOUST, MANAGER OF CORPORATE DEVELOPMENT, EBASCO SERVICES, INC.

ENERGY CONVERSION PROGRAM

Father COLLINS. Good morning, Senator.

With me is Oren Foust of Ebasco.

I would like to thank the committee for its support of our program which is to analyze a problem that is a Department of Army problem very similar to university problems in the use of energy. Because of the support of the committee, we have received a planning grant to work with the Army research and development to address a problem they have which is in the 1982 submitted plan for conversion of their oil and gas energy production systems to coal.

Working with them, we said why not approach in a unique way, it is a commercialization, that is, using private funds to take an emerging technology and present a plan that would use private funds at Army sites and have Georgetown be the baseline site.

The plan is to have 30-percent private funds in all of the installations and handle them as a package. The technology is to take coal gasification to a fuel cell for coal cogeneration.

SITES FOR COAL COGENERATION PROGRAM

We have analyzed four sites, one at Fort Greely, AK, one at Fort Hood, TX, Scranton Army Ammunition Plant, and the baseline at Georgetown.

We are pleased to report that all the sites are a package. The plan is not only feasible, but very beneficial to each site.

The major problem that each Army site has is its tremendous increase in cost of electricity. Since this is a cogenerating plant which produces both heat and electricity, each site will receive a very substantial benefit in its operating cost.

We visited every site, have reviewed it with a planning team of the Army's Corps of Engineers, also site engineers and the R&D team of Dr. Sculley. The plan is feasible and is ready to site. It is a multiyear program.

FUNDING FOR PROGRAM

The first year we would ask for the funding of the program at $9 million. It is the outreach years that is of benefit to the Army sites.

Good morning, Senator Stevens. I am explaining our program for coal gasification has evolved into a very specific recommendation to your committee.

It is of significant benefit to all the sites and at Fort Greely, where I personally was there, that site would reap a significant benefit.

As you know, Fort Greely uses oil. It is the cold testing spot for the Department of the Army and Department of the Defense and aptly so designated. We were there, as they say in Alaskan language, in minus 52 degree weather.

Each site has a specific condition that makes it capable of participating in the whole plan as a significant unit.

In summary, then, we do ask the committee for consideration of starting the program this year. As I say, it is a multiyear program. The out-years are the years in which the Army reaps its benefits.

The reason we would like to start is because it is tied to a package and an essential part of the package is a commercialization, using 30 percent, or more if we can, of private funds at each site. To do this, we have to take the existing tax laws which may be changing, but the existing tax laws are an integral part of the commercialization.

The participation we have indicated of private parties is based on starting it under the existing tax laws. So, I think, Senator, that is the sum of our substance. We would hope that the committee would seriously consider our request.

[The statement of Father Collins follows:]

PREPARED STATEMENT OF REV. T. BYRON COLLINS, S.J.

SPECIAL ASSISTANT TO THE PRESIDENT

GEORGETOWN UNIVERSITY

Mr. Chairman and members of the Committee, I am Rev. T. Byron Collins, S.J., Special Assistant to the President of Georgetown University. With me is Mr. Oren Foust ~~of EBASCO~~.

We thank the Committee for its support of a unique coal gasification fuel cell cogeneration program that has been developed by Georgetown/EBASCO in association with the Assistant Secretary of the Army for Research and Development. With the Committee's support of the $816,196 planning grant, we have visited the sites selected at Ft. Greely, Alaska; Ft. Hood, Texas; Scranton Army Ammunition Plant, Pennsylvania; and Georgetown University, which serves as the baseline site. We recommend that the committee direct that this multi-year program, noted in detail in the attached testimony, shall commence in FY'86 with $9,000,000 from funds available to perform the preliminary work elements for all four sites as a package. Program management will continue with the arrangement of Georgetown University in association with EBASCO under the purview of the Department of Army R&D. Whenever feasible, local subcontractors will accomplish the various specific elements at each site and will follow the Federal Acquisition Regulations.

A key reason for proceeding immediately is to allow third party participation under existing tax laws by getting appropriate letters to undertake all the projects at all the sites. As you know, the key to this program is participation by third parties in the commercialization process in order to reduce capital costs for the Department of Army. In addition, we are ready to proceed with all the elements of this program.

The ultimate goal of the program is to achieve system commercialization by installing several sets of plants in sequence, with the proportion of funds supplied by third-party investor/owner groups increasing at each succeeding step. In the case of this first set of four plants, the objective is to attract about 30% of the capital cost from third-party groups for full equity, and the remaining 70% as a DOA grant. It is believed that, as the system approaches commercialization and commercial prices, this 30%/70% ratio of private/DOA funding will improve to about 50%/50% with the second sequence of plants, and 100%/0% with the third or fourth set of plants.

The operating cost for purchase of heat and electricity for all sites would be less than the cost of the present system. The Army electricity cost has risen from $820 million in 1980 to $1.2 billion in 1983, though consumption has gone down. This program will put in a system to reduce energy costs substantially with less and less Department of Army capital costs. These reductions in operating cost would benefit each site.

GEORGETOWN UNIVERSITY/EBASCO POST SITE VISIT PROPOSAL
FOR
INSTALLATION OF COAL GASIFICATION FUEL CELL COGENERATION PLANTS

Common Characteristics

-- Each site would benefit from a coal gasification fuel cell cogeneration unit.

-- Preliminary information indicates substantial reduction of Army energy costs.

-- Provides an instrument and plan for third party participation which integrates commercialization with an emerging new technology.

-- Coal utilization assists Army in reducing its dependence on critical fuels.

-- There is potential positive third party interest in this program as currently packaged at four sites.

Scranton Site Specific Characteristics: (7.5 gross MW fuel cell)

-- The Army official, Col. Augsburger, Commander of the Scranton AAP, indicated a need and desire for this program.

-- Third party investment will have to include in its cost acquisition of a nearby available site to the Army Ammunition Plant.

Ft. Hood Site Specific Characteristics: (11.5 gross MW fuel cell)

-- The Army officials, Col. Doyle, Base Adjutant Commander, and Col. Jayne, Director of DEH, indicated a need and desire for this program.

-- Would utilize steam in the cogeneration process to produce as much air conditioning as possible.

-- Site location will necessitate construction of a 4,500 ft. buried energy line which may impose additional costs on the program.

-- Installation of fuel cell system should incorporate the existing central heating and air conditioning plants in the medical facilities.

Ft. Greely Site Specific Characteristics: (7.5 gross MW fuel cell)

-- The Army official, Col. Froehle, Director DEH, indicated a need and desire for this program.

-- Allows discontinuation of wheeling electricity from Ft. Wainwright to Ft. Greely, thereby avoiding both the 18% transmission line loss and the transmission line charge by the local utility.

-- Site characteristics may impose additional costs due to special insulation requirements.

-- Installation of fuel cell program should incorporate the existing central heating and electricity generating plant.

Georgetown Site Specific Characteristics: (11.5 gross MW fuel cell)

-- University officials see the need for this program, with Georgetown being baseline unit.

-- Site characteristics may impose additional excavation costs.

-- Serves as model for integration of third party participation using existing plant as an asset to the operations. This facet would be incorporated at each site.

-- Will demonstrate the practicability of meeting all site requirements since it is under the most stringent code ordinances in the nation.

-- Would package the requirements of all sites so as to achieve the maximum benefit for each site.

Conclusion

-- It seems essential that this be approached as a package instead of having each site done separately, since we have found interchange of information in the planning stage to be an essential component of our program.

Proposed Coal Gasification Fuel Cell
Project Summary Report of visit
to Scranton Army Ammunition Plant

Scranton Army Ammunition Plant (717)

Edward Solowiej	Chamberlain	342-7801
Dennis Clark	Chamberlain	342-7801
Herman Kranhel	Chamberlain	342-7801
LtC. Terry Augsburger	Commander Scranton AAP	342-7725
Capt. David Huller	Executive Officer	342-7801
Bernard White	Operational Readiness Division	342-7801

University of Scranton Representatives (717)

Rev. Neil P. McLaughlin, S.J.		961-7533
Dr. H.B. Strickland	President's Office	961-7665

Georgetown Representatives (202)

Fr. T. Byron Collins, S.J.	Project Administrator	625-3725
Dean Price	University, Architect Facilities and Planning	625-4352

EBASCO (212)

Oren Foust	Corporate Development	839-1292
Carl Trapp	Consulting Engineer and Project Manager	839-3978
Paul Estreich	Project Engineer	839-3292

Findings:

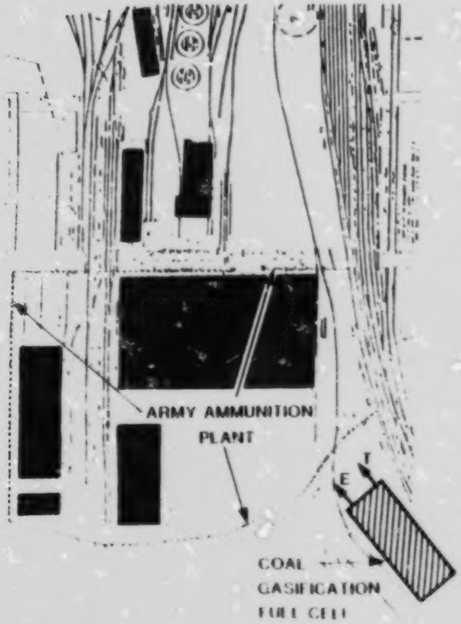
- The Army owned site is not a feasible location for the coal gasification fuel cell cogeneration facility because of the following;
    - a.) Constraints on the use of the Army owned land because of the mobilization program;
    - b.) Potential problems in the archaeological and historical studies on the site.

- There is nearby open land of three to five acres that would make an excellent site for the Coal Gasification Fuel Cell Cogeneration Facility Plant. A plan for acquisition of this adjacent land is being developed by a local third party group on a confidential basis.

- The information on the use of steam and electricity by the Army Munition installation is being analyzed. There are indications that a feasible economic benefit to the army will be worked out.

COAL GASIFICATION/FUEL CELL/COGENERATION (GFC)

SITE DIAGRAM - SCRANTON, PENNSYLVANIA
NOMINAL 7.5 MW FUEL CELL


ARMY AMMUNITION PLANT
E
T
COAL GASIFICATION FUEL CELL

PROPOSED DISTRIBUTION OF GFC ENERGY

ELECTRIC (E):

TO ELECTRIC UTILITY 7000KW

THERMAL (T):

TO ARMY AMMUNITION PLANT AND OTHERS

7

January 25, 1985.

Proposed Coal-Gasification Fuel Cell Project
Summary Report of Visit to Fort Hood

Fort Hood Representatives: (817)

Col. Doyle	Base Adjutant Commander	
Col. Jayne	Director-DEH	
Mr. James Butler	Chief Engineer	
Mr. John Easterwood	DEH-Engineering	287-4507
Mr. Joe Fritz	DEH-Energy	287-8774
Mr. Emmet Gray	DEH-Environmental	287-8754

Georgetown Representatives: (202)

Fr. T. Byron Collins, S.J.	Project Administrator	625-3704
Mr. Dean Price	University Architect Dir. Facilities and Planning	625-4352

EBASCO Representatives: (212)

Mr. Oren Foust	Corporate Development	839-1292
Mr. Carl Trapp	Consulting Engineer and Project Manager	839-3978

Findings:

The interchange of information among participants was excellent. The detailed discussion of the specific characteristics of the coal-gasification fuel cell program resulted in the following conclusions:

-- The consideration of the fuel cell program will be oriented mainly toward reducing electricity use for air-conditioning.

-- The site approved for location is in the facility engineer area of the base adjacent to a railroad spur and roadway.

-- Site characterisitics will necessitate construction of a 4,500 ft. steam line which may impose additional costs on the project.

-- The excellent utility cost records, engineering studies, and architectural land use will be analyzed.

-- The result of the preliminary analysis of the above information will point to the viability of further study.

Therefore, the participants concluded there is a "first blush" optimism that Fort Hood may be a viable site.

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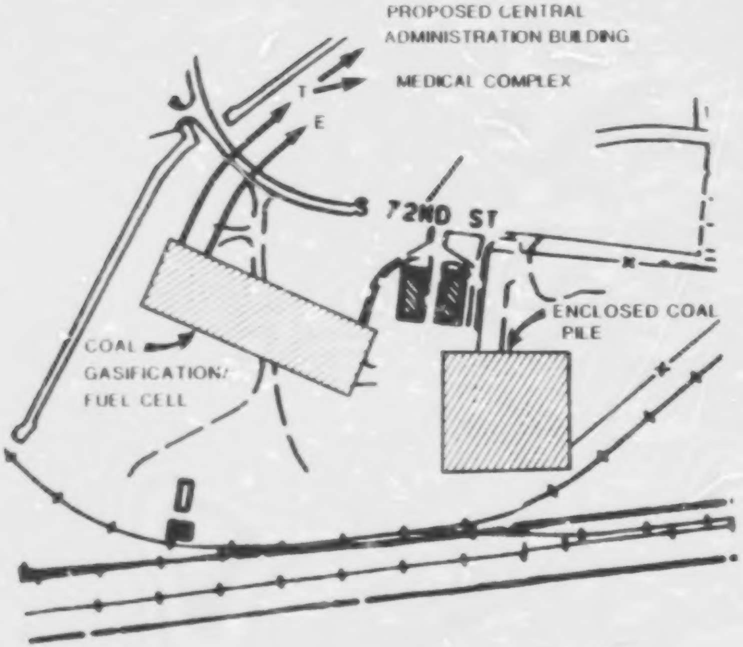
COAL GASIFICATION/FUEL CELL/COGENERATION (GFC)

SITE DIAGRAM - FORT HOOD, TEXAS
NOMINAL 11 MW FUEL CELL


PROPOSED CENTRAL ADMINISTRATION BUILDING
MEDICAL COMPLEX
T
E
72ND ST
ENCLOSED COAL PILE
COAL GASIFICATION/ FUEL CELL

PROPOSED DISTRIBUTION OF GFC ENERGY

ELECTRIC (E)

TO ELECTRIC UTILITY 10,400KW

THERMAL (T)

TO MEDICAL COMPLEX
AS STEAM AND CHILLED
WATER
(A FUTURE ABSORPTION
REFRIGERATION PLANT
RECEIVING STEAM FROM
GFC, WILL PROVIDE
CHILLED WATER)

Proposed Coal Gasification Fuel Cell
Project Summary Report of visit to Ft. Greely Alaska

Ft. Richardson (907)		
Col. Froehle	DEH-Director	862-2180
John Toomes	DEH Engineer	862-8180
Ft. Greely (907)		
Maj. Thomas Reeves	DEH-Assistant Dir.	
David Slenkamp	DEH Dir. of Engineering	863-4207
Mr. "Shorty" Shetleff	Resident Plant Engineer	
Georgetown Representatives (202)		
Fr. T. Byron Collins, S.J.	Project Administrator	625-3725
Dean Price	University Architect Facilities and Planning	625-4352
EBASCO (212)		
Paul Estreich	Project Engineer	839-3292
Thomas Grant	Consulting Engineer	

Findings:

-- The coal gasification fuel cell program analyst (G.U./EBASCO) study agrees with the determination that Ft. Greely is the preferred site for the Army installation of coal gasification fuel cell system in Alaska.

-- At Ft. Greely there is an excellent site location near the oil tank storage area that would tie into the main heating plant for the cantonment. (Plant H-606)

-- Site charateristics may impose additional costs due to special insulation requirements.

-- Coal is available in adequate supply from either a railroad siding about 80 miles distant or from development of coal mines about 6 miles distant the fort.

-- The Coal Gasifier Fuel Cell heat management system should be integrated into the existing oil fired central cantonment heating and electric generator system and be managed as one unit.

-- The economic plan for third party ownership and operation of the central energy plant should include both the new coal gasifier fuel cell system and the existing central cantonment heating and electric generation plant.

-- The economic plan recognizes that the electricity presently brought by the local Utility transmission line (Golden Valley Electricity Administration GVEA) would be discontinued.

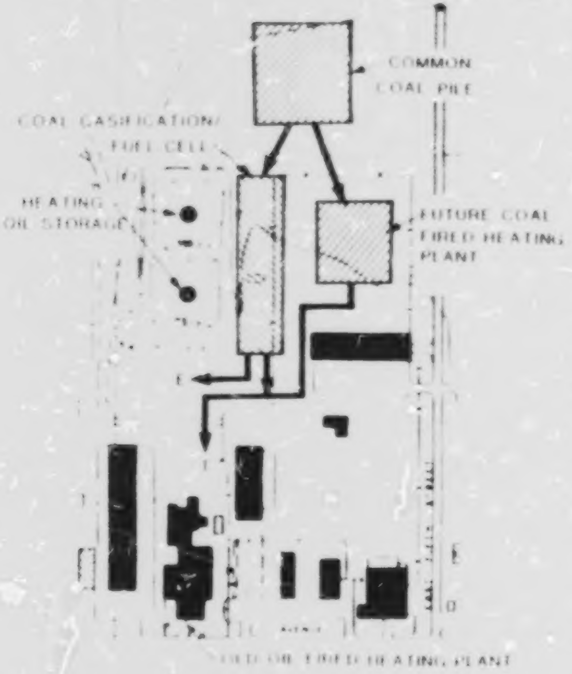
-- The economic plan from Ft. Wainwright in Fairbanks will propose sale of excess electricity to G.V.E.A.

-- The economic plan will investigate use of an Alaskan corporations as primary financier, constructor, and operator of the central plant to ensure an absolute guarantee of uninterrupted heat and electricity production year around.

-- Because of the remote site location, third party investment is likely to be less than at the other three sites.

COAL GASIFICATION FUEL CELL/COGENERATION (GFC)

SITE DIAGRAM FT GREELY, ALASKA
NOMINAL 7.5 MW FUEL CELL


COMMON
COAL PILE
COAL GASIFICATION/
FUEL CELL
HEATING
OIL STORAGE
FUTURE COAL
FIRED HEATING
PLANT
E
T
OLD OIL FIRED HEATING PLANT

PROPOSED DISTRIBUTION OF GFC ENERGY

ELECTRIC (E)

TO FT GREELY 2500KW (VARIES)
TO ELECTRIC UTILITY 4500 KW

THERMAL (T)

ALL TO FT GREELY

Proposed Coal Gasification Fuel Cell
Project Summary Report of Visit
Georgetown University/Washington, D.C.

Georgetown University (202)

Fr. T. Byron Collins, S.J.	Principal Investigator	625-3704
Dean Price	University Architect and Planner	625-4352
Bill Vaudreuil	Director of Maintenance	625-3403
Doris Lyons	Director Sponsored Programs	625-3423
Joe McDade	Assistant Administrator	625-3775

EBASCO (212)

Oren Foust	Corporate Development	839-1292
Carl Trapp	Project Manager	839-3978
Paul Estreich	Project Engineer	839-3292

Findings at System Baseline Location at Georgetown University

- Favorable site location, which is compact in nature, but provides adequate space for at least one 11.5 gross MW module.

- Compactness of site is necessitated by its placement in close proximity to other University building and heavily trafficked areas of the campus. This in turn, requires development of a plan to control dust emissions, odor, and noise that can be used at other sites.

- Site characteristics may impose particular excavation costs on the project.

- Economic plan for third party ownership may include present district heating cooling and cogeneration plant.

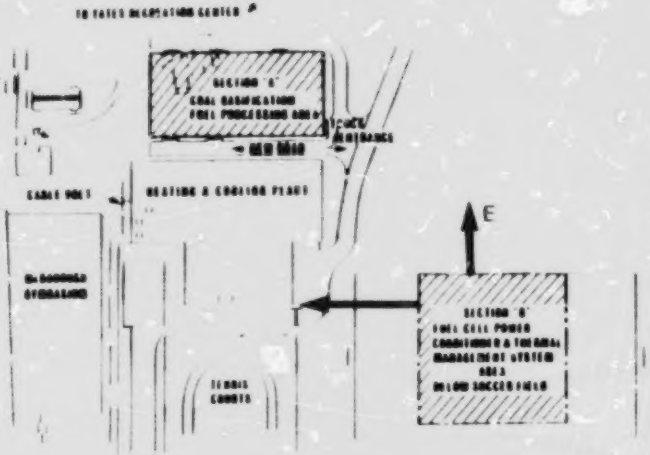
- Emphasis will be given to producing equal amounts of electricity and thermal energy at this site.

- There are two potential sources of coal for the fuel cell system, Unionvale Corp and ANR, which are both in Kentucky.

- Site characteristics are favorable to make this baseline site the model for integration of third party participation, using existing plant as an asset to the operation for each site, by selling existing plant to third party.

COAL GASIFICATION/FUEL CELL/COGENERATION (GFC)

SITE DIAGRAM - GEORGETOWN UNIVERSITY
NOMINAL 11 MW FUEL CELL


TO YATES RECREATION CENTER
SECTION "A"
COAL GASIFICATION
FUEL PROCESSING AREA
ENTRANCE
NEW ROAD
HEATING & COOLING PLANT
E
SECTION "B"
FUEL CELL POWER
CONDITIONER & THERMAL
MANAGEMENT SYSTEM
AREA
BELOW SOCCER FIELD
TENNIS
COURTS

PROPOSED DISTRIBUTION OF GFC ENERGY

ELECTRIC (E):

TO ELECTRIC UTILITY 10,400KW

THERMAL (T):

TO GEORGETOWN UNIVERSITY AND OTHERS

ATTACHMENT #1

ARMY/GEORGETOWN R&D PROGRAM FOR COAL GASIFICATION/FUEL CELL/COGENERATION

FY 1986 FUNDING ALLOCATION

REQUEST
$9,000,000

ARMY/GEORGETOWN R&D PROGRAM FOR
COAL GASIFICATION/FUEL CELL/COGENERATION
FY 1986 FUNDING ALLOCATION

Work Element	Funding
1. Preliminary Engineering and Coal Gas Product Testing	
. Engineering	$3,000,000
- coal supply options - coal specifications (design and range) - coal delivery options - coal handling and storage facilities - coal gasifier options (stages and process) - gas cleanup, shift and desulfurization process - cogeneration system design (heat recovery boilers, deaerators, turbines, condensors, pipelines) - auxiliary, startup and backup systems design - fuel cell assembly requirements - system trade-off analysis (secondary fuel, redundancy, max. MW vs steam quality) - environmental controls (ESP, waste treatment) - excavation and foundation requirements - finalized site arrangement and equipment lists - process flow diagrams and energy balances - performance estimates (availability, efficiency) - design engineering, licensing, procurement, installation schedule	
. Coal Gas Product Testing	$3,000,000
- available test facility options - test coal delivery options - test guidelines (number, duration) - model design (gasifier, cleanup, shift systems) - data collection and analysis - design modifications and retesting - fuel cell integration testing concept design	

Work Element	Funding
2. **Definitive Cost Analysis** - detailed quantity takeoffs and estimates - equipment manufacturer estimates - fuel cell assembly cost and schedule status - delivered coal cost and contract durations - life cycle cost analysis (capital outlay, carrying charges, O&M costs, fuel costs, energy costs) - Sensitivity analysis (fuel cell costs, fuel costs)	$ 500,000
3. **Environmental Baseline** - licensing and permit requirements - emission estimates (air, water, solid waste) - environmental standards & control requirements - multidisciplinary baseline analytical and field assessments (air quality and meteorology, terrestrial and aquatic ecology, liquid and solid wastes, land use and socioeconomics, noise) - applications and support document preparation	$2,000,000
4. **Business Arrangements and Financing** - finalized energy costs (current, future, levelized) - utility buy back rates and standby capacity charges - thermal user payments and credits - detailed cash flows and before-tax profitability assessments - detailed discussions with potential third party investors and establishment of investment criteria and constraints, (equity position, ROE, payback schedule, risk) - detailed discussions with financial institutions (financing limits, terms, conditions) - financing arrangement options - identification, analysis, and investor feedback	$ 500,000
Total Work Element Funding (1-4)	$9,000,000

ATTACHMENT #2

ARMY/GEORGETOWN R&D PROGRAM FOR COAL GASIFICATION/FUEL CELL/COGENERATION

PROGRAM SUMMARY
FY1986-1990

ARMY/GEORGETOWN R&D PROGRAM FOR COAL GASIFICATION/FUEL CELL/COGENERATION PROGRAM SUMMARY

The coal gasification/fuel cell/cogeneration program is envisaged as a five (5) year program. It is estimated that the four (4) R&D facilities will cost about $150 million in 1983 dollars, about $110 million army funds and $40 million private investment. This is about $4000 per installed kilowatt.

Fiscal Year (FY)	Key Work Elements	Cost Estimate (Constant 1983 $) ($1000) Army Funds	Cost Estimate (Constant 1983 $) ($1000) Private Funds	Cost Estimate (Escalated FY $) ($1000) Army Funds	Cost Estimate (Escalated FY $) ($1000) Private Funds
1986	-perform preliminary engineering and gas product testing	9,000	-	9,000	-
	-perform definitive cost analysis				
	-determine environmental baseline				
	-investigate business arrangements and financing alternatives				
1987	-initiate licensing activities	20,000	-	25,000	-
	-perform final engineering and design analysis				
	-perform gas product-fuel cell integration/performance testing				
	-continue business arrangements and financing alternatives				
	-initiate fuel cell and long lead equipment procurement				
1988	-complete permit acquisition	30,000	-	40,000	-
	-initiate fuel cell fabrication				
	-complete equipment and construction services procurement				
	-finalize structures for business arrangements and financing packages				
1989	-initiate site construction	35,000	-	45,000	-
	-finalize operating, maintenance, safety and test procedures				
	-execute business and financing contracts				
1990	-complete construction and installation	16,000	40,000	21,000	50,000
	-complete start up and testing				
		110,000	40,000	140,000	50,000
	Total	150,000		190,000	
	Not to Exceed:	125,000	45,000	160,000	60,000
	Total	170,000		220,000	

ATTACHMENT #3

ARMY/GEORGETOWN R&D PROGRAM FOR
COAL GASIFICATION/FUEL CELL/COGENERATION

SUMMARY TASK DESCRIPTIONS
FY1986-1990

ARMY/GEORGETOWN R&D PROGRAM FOR
COAL GASIFICATION/FUEL CELL/COGENERATION
SUMMARY TASK DESCRIPTIONS

The coal gasification/fuel cell/cogeneration program is envisaged as a five (5) year program for the licensing, design, installation and testing of the four (4) R&D facilities. The major work elements comprising the overall program are summarized below.

FY1986 Work Elements:

1. Perform Preliminary Engineering and Coal Gas Product Testing

   Preliminary engineering and system design trade-off analyses will be performed for each site. This engineering effort will be coordinated with and assisted by the fuel cell and coal gasification manufacturers. Representative project coal supplies and gasifier systems will be tested in manufacturer pilot facilities to verify expected product gas quality. System design modifications will be made if indicated by the test results.

2. Perform Definitive Cost Analysis

   Using the above site-specific system designs, precise project cost estimates will be made for each site. Detailed discussions with fuel cell manufacturers and potential coal suppliers concerning cost and schedule, initiated during the planning study, will be continued.

3. Determine Environmental Baseline

   Investigations will be conducted to characterize the existing environmental baseline at each site in order to evaluate the impact of the proposed facilities.

AVAILABLE

4. Investigate Business Arrangements and Financing Alternatives

Precise financial and economic analyses will be made for each site and the initial concepts concerning business arrangements and financing options refined. Detailed discussions with potential energy customers including electric and thermal, third party private investors and financial institutions that were initiated during the planning study will be continued.

FY1987 Work Elements:

1. Initiate Licensing Activities

The necessary federal, state and local permit applications and support documents will be prepared and submitted for each site.

2. Perform Final Engineering and Design Analysis

The final design will be established for all major, auxiliary, start-up and backup systems incorporating the results of the system trade-off analyses and coal gas product tests. Final flow diagrams and construction drawings will be developed for each site.

3. Perform Coal Gas Product - Fuel Cell Integration Testing

The product gas for each coal type/gasifier combination will be tested in fuel cell manufacturer pilot facilities to verify expected impact of gas purity on fuel cell performance.

4. Continue Business Arrangements and Financing Alternatives

The discussions and negotiations with potential energy customers including electric and thermal, third party private investors and financial institutions will continue and the business arrangement and financing schemes will be refined and tailored to each site situation.

5. Initiate Fuel Cell and Long Lead Equipment Procurement

Specifications for the coal supply and such long lead equipment as the fuel cell assembly, coal gasifier and handling/storage equipment will be developed, bids evaluated and supply contracts awarded.

FY1988 Work Elements:

1. Complete Permit Acquisition

   Licensing support activities will continue until all permits and approvals necessary for facility construction and operation are obtained.

2. Initiate Fuel Cell Fabrication

   Initial funds will be committed to release the manufacturers for fabrication of the four fuel cell assemblies.

3. Complete Equipment and Construction Services Procurement

   Specifications will be issued, bids evaluated and supply contracts awarded for all remaining plant equipment and construction related support services.

4. Finalized Structures For Business Arrangements and Financing Packages

   Final agreements will be reached with potential energy customers including electric and thermal, third party private investors and financial institutions on the business arrangement and financing package for each site.

FY1989 Work Elements:

1. Execute Business and Financing Contracts

   Negotiations with facility energy customers including electric and thermal, third party private investors and financial institutions for each site will be concluded and contracts signed. Legal charters for each owner/operator entity will be obtained and the third party investment commitment satisfied.

2. Initiate Site Construction

   Onsite civil work such as roadways, pipeline access, excavation and foundations will commence upon receipt of construction permits.

3. Finalize Operating, Maintenance, Safety and Test Procedures

   Standard operating, maintenance, safety and test procedures will be completed for each site.

BEST [illegible] AVAILABLE

FY1990 Work Elements:

1. Complete Construction and Installation

Facility construction and installation activities will be finalized at each site and all interconnections with electrical and thermal customers completed. Inventory (fuel, chemicals, etc.) for startup, testing and initial operation will be established.

2. Complete Startup and Testing

Performance evaluations will be made of all plant systems during the startup and testing phase to ensure quality of design, compliance with specifications and achievement of manufacturer guarantees.

PROGRAM STUDIES

Senator STEVENS. Are the studies complete now?

Father COLLINS. The studies outlined are sufficiently indicative, as they are in the testimony, to show that we should start now.

Senator STEVENS. As you know, we are quite interested in this. My city has lots of coal. It would be a very interesting thing if it could be proven.

COST OF 5-YEAR PROGRAM

Do you have a real cost for the 5 years?

Father COLLINS. Yes.

Senator STEVENS. What are the real costs?

Father COLLINS. The first year we have tied down which is $9 million. The cost in the other years are such that we are willing to put them on record and stay with them.

Senator STEVENS. Have you put them on record?

Father COLLINS. Yes, they are part of the testimony.

Senator STEVENS. The total is $150 million now?

Father COLLINS. That is correct.

Senator STEVENS. For a 5-year program?

Father COLLINS. Yes. If you will notice, in that figure there is a commercialization which will put up $40 million of that.

Senator STEVENS. Is that committed?

Father COLLINS. If we get the approval for the $9 million, the answer is that we will have committed.

Senator STEVENS. I got caught up in it as a preliminary thing. My State was not on board as it was.

Have you worked that out with the State of Alaska?

Father COLLINS. Yes, we have.

Senator STEVENS. We have not been so informed.

Father COLLINS. I worked with Colonel Froehle. In the testimony you will find his statement that he has agreed.

Senator **Stevens**. I would urge you to get the participants tied down. I think there would be great support for this concept.

There is a coal caucus in the Congress. There is no question this would be significant to overall help to the coal industry.

Other than your urging us to proceed, we have not had any real impetus from anyone else?

Father **Collins**. We will get that for you, Senator.

Senator **Stevens**. Thank you very much.

I apologize for being late. I was involved in a health care program. I appreciate Senator Rudman's starting the hearing.

The next witness is Richard Johnson.

Non-Commissioned Officers Association

STATEMENT OF RICHARD JOHNSON, DIRECTOR, LEGISLATIVE AFFAIRS, U.S. MARINE CORPS (RETIRED), VICE PRESIDENT FOR GOVERNMENT AFFAIRS

MAJOR AREAS OF ASSOCIATION CONCERN

Mr. **Johnson**. Thank you, Mr. Chairman.

Mr. McKinney extends to the committee his apologies for not being able to participate in this morning's hearings.

I do ask on behalf of the association that his statement be entered into the record.

I am a director of legislative affairs for the association. Hopefully I will prove an acceptable substitute for McKinney.

The association has three major areas of concern.

Our primary interest is in pay.

Second, the association has abiding interest in quality of life issues and family programs for the military.

Finally, the association would like to share with the committee a few remarks on the military retirement system.

PAY RAISE PROPOSED

The pay raise proposed for July of this year is of critical importance to the Armed Forces. Failure of this Congress to provide a pay raise for military personnel will lead us back to the critical manpower shortage which plagued the military in the late 1970's. The warning signs of this are all there.

The Nation's economy is continuing to improve, unemployment is continuing to decline. There is a rising concern among the young service members of the perceived neglect and some very real attacks on military personnel and benefits.

The latest youth attitude tracking survey has measured a 5-percent decrease in the propensity of young men to join the service. It has fallen to its lowest levels since 1979.

Further, the services are forcasting trouble potentially leading to the loss of thousands of skilled noncommissioned petty officers if the proposed July increase is not adopted.

Mr. Chairman, Senator Rudman, we urge the members of the committee not to be beguiled by the recruiting success of the recent past. The volunteer force will only maintain its success through continued and conscious effort of the Congress. This effort begins with keeping military pay both competitive and comparable.

PCS REIMBUREMENT

PCS reimbursement remains a major area of concern among career service members. I will not belabor the substantial differences between reimbursement of Federal civilian employees and military personnel.

Increased funding of household goods, weight allowances, mileage reimbursement, funding for temporary lodging expenses, are all issues of equity and are badly needed.

On family programming NCOA urges full funding of CHAMPUS, survivor benefit programs, dental care for military retirees and dependents of active duty personnel and improvement in debt gratuity payment.

Additionally, while construction of housing is beyond the scope of this committee, the need to provide adequate housing is a shared responsibility. In the absence of sufficient housing to support the Armed Forces, it is necessary to provide alternatives. Accordingly, full funding of quarters, allowances and variable housing allowances is also requested.

MILITARY RETIRED PAY

Finally, in his prepared statement Mr. McKinney has addressed the issue of military retired pay at some length. The benefits paid under this system are not pensions or welfare. They are earned benefits based on 20 or more years of service.

Furethermore, the benefits to enlisted members are not nearly as generous as some would have you believe. NCOA recommends against the piecemeal change in this retirement system.

Further, the association recommends Congress issue a summary assurance to those people who are currently on active duty. A sense of the Congress resolution endorsing the concept of grandfathering any changes in military retirement pay would be a no-cost boost to force morale which NCOA believes would be immediately reflected in improved recruiting, retention, and readiness.

That concludes my summary, Mr. Chairman. I will be happy to answer any questions you and Senator Rudman may have.

[The statement of Mr. Johnson follows:]

PREPARED STATEMENT OF RICHARD JOHNSON
DIRECTOR, LEGISLATIVE AFFAIRS
NON COMMISSIONED OFFICERS ASSOCIATION OF THE UNITED STATES

MR. CHAIRMAN: I am Retired Sergeant Major C. A. (Mack) McKinney, U. S. Marine Corps, Vice President for Government Affairs, Non Commissioned Officers Association of the USA (NCOA). NCOA is the largest quasi-military association serving career enlisted military personnel of the U.S. armed forces. Of its 175,000-plus voting members, 83 percent are currently serving on active duty as Noncommissioned and Petty Officers in the Army, Navy, Marine Corps, Air Force and Coast Guard. The remainder have served; some retired, others are veterans or are serving in the Reserve and National Guard.

I extend the appreciation of all members of NCOA for allowing me to express the association's views on the FY 1986 Defense Manpower Appropriations request. At the same time, NCOA gratefully acknowledges the work of this distinguished panel over the past years in providing quality-of-life improvements for our servicemembers. The association applauds and salutes the chairman, members and the staff for a job well done.

First, I wish to relate to the subcommittee that NCOA is well aware of the deficit the nation has faced in the past years and the obvious one waiting for us if the FY 1986 budget request is approved. The subcommittee is faced with a growing list of needs far beyond available funds. Sizable cuts will be made but NCOA is in hope those cuts will not come from many of the military personnel items which have awaited corrective action from Congress over the years.

NCOA has always advocated a strong U.S. defense posture. Rarely has the association recommended decreasing hardware requests to satisfy the quality-of-life improvements needed in the military manpower structure. However, there is again a deep concern that sustained rejections of important military personnel items will bring about another exodus of career enlisted and officer personnel as occurred in the late 1970s. Also of great concern is the proposal to reduce the current strength of the defense manpower forces, particularly those of the military. Last, but not least, is the association's interest in the military retirement program.

MILITARY MANPOWER IN THE 1980s

Today's armed forces have, for the most, the finest, best disciplined, dedicated, and qualified servicemembers in the history of a peacetime military. The differences in today's military members and their counterparts of 5-to-10 years ago is likened to the contrast between red hot and ice cold. Right now they are running red hot but there are cooling-off signs appearing on the surface.

In many ways the recruiting and retention of quality personnel have a most significant effect on the costs of military manpower, but there is a choice. Congress can return to a selective draft which NCOA opposes for reasons related to the preceeding paragraph. Additionally, quality makes today's servicemembers more trainable, causes less disciplinary problems, reduces early attrition, brings a greater sense of pride and loyalty to the armed forces, and importantly, offers greater job satisfaction to noncommissioned, petty, warrant and commissioned officers who must train and lead them through their formative years in the military. These and other factors add up to a high-level of combat readiness never before enjoyed by this nation in a peacetime environment.

They also add up to real but intangible savings in overall manpower costs. Returning to a peacetime draft would surely reduce our current readiness posture and cause a repeat of the 1970 turmoil that overtook our career enlisted and officer ranks. This nation cannot afford to lose what it has done over the past 5 years to bring military personnel to the level of readiness it now enjoys.

MILITARY COMPENSATION

There is much to do about military compensation. Almost everyone appears to have their own view concerning the adequacy of military pay; regretfully too many use officers' pay to make comparisons. Whether officers' pay is too much, just right or too little must be determined by other than those in the enlisted grades. NCOA does state unequivocally that the pay for many noncommissioned and petty officers, particularly in pay grades E-4 through E-7, has been deliberately depressed over the years.

NCOA believes Congress should again take a hard look at the possibility of targeting another pay hike for E-4s through E-7s. E-4s and E-5s, for example, receive insignificantly small wage increases for assuming greater authority and leadership positions upon advancement to those grades.

In a paper NCOA submitted earlier this year to the President's Advisory Committee on Federal Pay, special attention was directed to the pay of E-4s and E-5s. It noted that an E-3 advancing to E-4 and assuming the position of squad leader receives only a 6 percent hike in basic pay. An E-1 promoted to E-2, continuing as a member of a fire team with no more authority or responsibility, receives a 12 percent raise. The new E-2 is now richer by $2.50 each day while the new E-4 takes on additional duties for only $1.48 a day. (NOTE: This paper is available to the subcommittee upon request.)

Of course, NCOA does not anticipate an increase in basic pay sufficient to cover a targeted pay hike in FY 1986. Since there have been nothing but caps placed on pay raises since October 1981, delays in paying the increases from October to January, and a loss of purchasing power over a 3 1/2 year period, NCOA encourages Congress to approve the Administration's request for a 3 percent across-the-board pay hike effective July 1, 1985.

OTHER PERSONNEL PROGRAMS

NCOA continues its support for improvements in Permanent Change of Station (PCS) programs. Increased funding for higher household goods weight allowances, mileage reimbursements and temporary lodging expenses are not only needed but necessary to correct existing deficiencies and inequities. When Congress requires our servicemembers to pay out-of-pocket expenses for moving their families and households under government orders without adequate reimbursement an injustive exists. The injustice is magnified, with every move, on average of every three years, as families and household goods grow larger.

NCOA also urges Congress to approve the requested funds for recruiting. Tougher times are ahead. Quality can be maintained only if there are experienced recruiters out there in the civilian sector to do the job. They need the money and the tools to accomplish their tasks in an ever-increasing and growing competitive climate.

FAMILY ISSUES

Over the years more and more military personnel are marrying, many of them early in their initial enlistments. Some are married on entry in the Services. This change in social mores places a larger demand on the military to provide more and better family services.

NCOA urges Congress to review at length and make much needed improvements in the CHAMPUS program, survivor programs, dental care for active duty dependents as well as retirees, burial expenses and death gratuity payments. Additionally, the association encourages the subcommittee to take another look at housing allowances. Some are adequate others not. When servicemembers are called upon to make constant moves, involuntarily assigned to remote locations, ordered to spend extra time at sea or overseas, forced to separate from family and friends, plus other contingencies of military service, the least Congress can do is provide them with adequate housing or quarters, or furnish allowances that are sufficient to cover the cost of adequate housing, and care for their families while they serve this Nation.

Although some may say that a draft would cure the need for funding many of these family services, NCOA believes the current marital status of our servicemembers will not change to any significant degree. If anything, the association further believes the number of married junior enlisted members will increase. This will create a greater demand on the Services to care for families whose military heads are too inadequately compensated to do it themselves.

MILITARY STRENGTHS

NCOA cannot in good conscience, irrespective of the budget deficit, agree to a reduction in current military manpower strengths. The association may very well disagree with any cut in civilian strengths. The reason is simple; there isn't enough manpower to meet required commitments imposed on the military by the Administration, Congress and the Services themselves.

A reduction of 76,200 in military manpower and a cut of 104,600 in current civilian strengths would drop total DOD manpower levels to those related with the 1970s, following the Vietnam conflict, and far below those of the post-Korea era, including the Cuban crisis of 1962. In both periods, the 1970s and post-Korea era, many units went to a "housekeeping" status. Troops had to abandon quarters, working areas, housing, maintenance of weapons and other equipment, to mention only a few, allowing the environment to act as their watchdog.

Training took second place, time permitting and there generally wasn't any. Troops were used to maintain grounds, work longer hours and days trying to keep useful systems and equipment operable and picking up beer cans off of highways. They also filled in after hours for civilian workers who could not complete their tasks in an 8-hour workday (no overtime authorized), and - in general - watching combat readiness fall to a deplorable level.

Three major reasons caused career enlisted and officer servicemembers to abandon the military in the late 1970s. One was inadequate pay, another was the low-quality of personnel entering the services and third was the lack of manpower to accomplish the missions assigned to the units. NCOA can only warn Congress again, as it did in the mid-1970s, that it cannot ignore personnel programs and expect servicemembers to accept the results without "voting with their feet."

MILITARY RETIREMENT

One more issue now confronts military personnel - that of threats to their retirement system. Most military retirees are in enlisted pay grades E-6 and E-7. On retirement at 20 years of service, their retired pay is less than the median income of a couple retired on social security and far less than what some welfare recipients receive from federal and state funds.

Further, most leave the service because they've reached their terminal grade, the Services have no further use for their talents, they are too old to effectively function in a combat environment, their families have had enough of separations and moves, or they've spent too much time at sea or deployed overseas. When they retire, many have growing families and are unable to survive on the small stipend they receive as retired pay.

NCOA believes the current retirement system is neither lavish nor generous. For many who served, the receipt of retired pay is more than "reduced compensation for reduced services." It is "deferred" pay promised to those who stayed on active duty for 20 or more years to honorably serve their nation and its citizens. Additionally, quite a few served in World War II, Korea and Vietnam.

NCOA makes no recommendation for a change. However, the association suggests that those members of Congress who are sincere in "grandfathering" the current system may want to introduce and actively support a resolution making it the sense of Congress that no changes will be made to the system for those now on active duty. This will do wonders for the morale of our servicemembers. It may cause many of them to change their minds and opt for longer service beyond 20 years. (NOTE: NCOA has a pamphlet available on the military retirement system that is available to the subcommittee upon request.)

CONCLUSION

The ball, so to speak, is in the hands of Congress. The decisions made this year will dictate the way the military goes in subsequent years. The wrong decisions will cause a reversion in combat readiness to a level of "unacceptable," as in the late 1970s. The right decisions will sustain the current level which has never been equaled in quality, morale, discipline and readiness.

Thank you.

MILITARY SUPPORT PERSONNEL

Senator STEVENS. He has one and I have one. Maybe mine is the same as his.

Have you studied Senator Rudman's proposal?

Mr. JOHNSON. Not at length, Senator. I am familiar with the Senator's desire to trim military personnel, particularly in support positions.

Senator RUDMAN. I will correct that, in direct support of the military you have been penalized by the Pentagon's insufficient information.

Senator STEVENS. I would welcome your comment. I think Senator Rudman's proposal is looming larger and larger on the horizon for those of us who don't want to slow down the modernization program.

I think we should give sufficient warning we are going to give it very serious attention and for those who want to be heard, these hearings are the time to be heard.

Mr. JOHNSON. We will be happy to provide some additional remarks for the record.

The primary concern that we have is in the 1970's when we were losing personnel, we were losing personnel for three reasons.

We were losing personnel because pay was not adequate, one.

Because of the quality of the guy standing next to you lacked something.

And because there weren't enough people to do the jobs assigned to the Armed Forces. There weren't enough people to carry out the mission.

In this day and age when we have so many commitments around the world, I believe it is a wrong trend to embark on at this time.

CUTS IN PERSONNEL

Senator STEVENS. We have to assume reality. We don't have the votes to increase the benefits that come out of defense funds. We need your voice and the voice of organizations such as yours as to where those cuts should be applied.

I was in a meeting again last night. We were told of a $21 billion reduction. Now, that $21 billion is obviously going to come out of that budget. These public hearings are the time when we should be getting that kind of advice.

I would hope that your organization would give serious consideration as to where we can make the $21 billion in cuts.

Mr. JOHNSON. Unless force commitment is cut, I don't see how personnel can be cut to go along with that. If you reduce the number of weapons systems and reduce manning requirements and reduce forces around the world, perhaps people will be a place to cut the budget.

Now, the only place to cut people from the budget is a matter of convenience and matter of safety.

SACRIFICES BY MILITARY PERSONNEL

Senator RUDMAN. I have one question for the witness. I would like to get an answer for the record from your association.

Recognizing much of what you say, which I don't disagree with, but again looking to reality of this year, if in fact we are going to ask the elderly of the country to make some sacrifices, we are going to ask the young people of this country to make some sacrifices, we are going to ask the farmers to make sacrifices, we are going to ask those who are interested in many social programs to make sacrifices, is your association willing to come forward and say that members of the armed services also, as long as it is fair and equitable, are willing to make some modest sacrifices?

That is the answer I would like from your association.

Mr. Johnson. As Long as it is fair and equitable, Senator, we cannot resist making those kinds of sacrifices.

We also have to put this in context. Over the past several years through pay caps, through reduced funding of military personnel programs, through a 4-year program of temporary lodging allowances that have never been funded, through consistent inadequacy of reimbursement for PCS moves, our service members have made sacrifices already.

Senator Rudman. Frankly, I don't see the corresponding sacrifices on the part of these groups you mentioned.

Senator Stevens. I fail to understand that answer, my friend. If we look at the adjustments in military pay since 1970, not counting fringe benefits such as free health care, food and housing allowances, noncontributory retirement or any of the exchange services, military wage increases have been 214.2 percent.

In the civilian sector of the Federal Government it has been 130.5 percent. If you want to know, for Members of Congress, it is 76 percent.

So, I don't think it will fall on very friendly ears to tell us we have not been very attentive to the needs of the military in the last 10 or 15 years.

CHANGES IN FORCE STRUCTURE

Mr. Johnson. Senator, I don't want to be put in a position to sit here and disagree with you, but we made a very substantial change in force structure in that period that you have identified.

One of them was to go to an all-volunteer force. We did away with conscription wages in the armed services in 1972. That led to a substantial portion of that increase in pay. That was not done to benefit the service members nearly as much as it was done to benefit the country as a whole, to get away from that conscripted armed force.

If we want to go back to conscription, there are additional ways to save money. Again, the association resists that. We are not in favor of returning to a conscripted armed force because we will suffer the loss of quality that we have now.

Senator Stevens. What we are really looking for is advice from associations such as yours, as we face up here support for continued increase in military spending, where you would like to see the cut we must make. That is my request to the association. That will be the request to every association that comes here.

We would like you to tell us if you were in our seat and had to cut $21 billion, where would you cut it?

I think we are entitled to that advice. We have accepted your advice as to where to make increases in the past. Now we want your advice where would you make cuts?

Mr. JOHNSON. Senator, I will provide that for the subcommittee files.

AREAS OF REDUCTION IN MILITARY BUDGET

Senator STEVENS. Senator Proxmire.

Senator PROXMIRE. Thank you, Mr. Chairman.

Mr. Chairman, I want to congratulate you for inviting the Noncommissioned Officers Association representative to appear. They have something useful to tell us.

You are looking over here on the Republican side to two real experts in the military. They have done a great job, two of the most faithful, hardworking members of the Senate, and all of us are looking for advice on this.

I just want to ask if it is not true that when you consider the adequacy of compensation, you have to look at what the compensation was at the base you are talking from?

In other words, the chairman made a very good point that Members of the Congress have only had a 76-percent increase while the civilian sector is 130 and military personnel is 214. Members of Congress are now getting $75,000 a year salary. Your noncommissioned officers I presume would be willing to settle for that even if you did not get that kind of percentage increase.

Let me ask you, would you feel in general that any reduction in the military might be taken out of procurement rather than personnel inasmuch as the personnel is the heart of any operation?

No matter how good your equipment is, unless you have people who are trained, skilled, motivated, well led, you can't get results?

Mr. JOHNSON. Senator, you make an excellent point. That is we have a labor-intensive industry with which we are dealing. Regrettably, most of the dollars in that industry, defense, goes to those personnel. Cuts in procurement, as desirable as they would be, will not produce the cost savings I think the committee is searching for.

Yes, I agree with your premise and that would be our look at it.

I apologize for concentrating my attention over here, Senator. We deeply appreciate that you recently introduced a bill to raise SDLI. We were quite aware of your support for military services and we appreciate that.

Senator PROXMIRE. Thank you.

Senator STEVENS. Senator Sasser.

Senator SASSER. No questions, Mr. Chairman.

Senator STEVENS. Thank you very much, Mr. Johnson. We appreciate your testimony.

Mr. JOHNSON. Thank you, sir.

Senator STEVENS. Henry Walther, U.S. Defense Committee.

U.S. DEFENSE COMMITTEE

STATEMENT OF MR. HENRY L. WALTHER, EXECUTIVE VICE PRESIDENT, UNITED STATES DEFENSE COMMITTEE

DESCRIPTION OF DEFENSE COMMITTEE

Mr. **WALTHER**. Good morning.

Thank you for once again allowing me to testify before this subcommittee.

My name is Henry Walther and I am the executive vice president of the U.S. Defense Committee.

The U.S. Defense Committee is a public interest organization dedicated to a strong national defense and foreign policy.

We are an organization of over 130,000 Americans who come from all walks of life; machinists, farmers, small entrepreneurs, doctors, lawyers, active and retired Service personnel.

CURRENT STATE OF DEFENSE IN THE UNITED STATES

What binds all these people together is a concern that America's defenses are not what they should be.

They, and millions of other Americans are very concerned that Congress, over the last 20 years, has allowed the defense of this Nation to fall behind the efforts of the Soviet Union.

COMPOSITION OF DEFENSE BUDGET

As executive vice president of the U.S. Defense Committee, let me now outline to you several of the specific concerns voiced by the members of our organization in regard to the composition of the defense budget.

READINESS OF U.S. ARMED FORCES

First, the U.S. Defense Committee's members, many of whom are retired military personnel, have expressed to me an uneasiness over the military readiness of our Armed Forces.

They have stated that if America is willing to station brave men and women at front lines around the world, then we also must make sure that they have enough of the best equipment to deter any possible attack.

Soldiers without ammunition, backed up by pilots who don't have enough flying hours, and who are flying planes that are too often idled by lack of spare parts, is not the sort of deterrent that the Soviets take seriously.

Yet, Congress has continually slashed administration requests for defense spending, and has focused their cuts on the so-called soft spots in the budget, namely military readiness, which is in fact the heart of America's ability to use conventional forces to protect vital interests.

STRATEGIC WEAPONS

In the area of strategic weapons, our members fully support the modernization of America's triad: The B-1B bomber, the Peacekeeper missile and new submarines and missiles for our sea-based nuclear fleet.

Also, in the context of strategic weapons, our members wholeheartedly support the proposals by the administration for the research and development of a ballistic missile defense.

SOVIET MISSILE CAPABILITY

The Soviet efforts to have a breakout capability in regard to a system of ballistic missile defense is a grave and ominous threat.

Recent deployment of several new PISKINO phase array antiballistic missile defense battle management radars is just one step the Soviets have taken.

The deployment of SH-04 and SH-08 interceptor missiles is another step and constitutes a system of layered defense.

The modification of the SA-12 surface-to-air missile against ballistic warheads is also part of a layered defense.

With these technologies the Soviets potentially have an active missile defense system.

As it stands now, the Soviets already have the ability to destroy virtually our entire land-based missile force.

An America that is vulnerable while also unable to launch an effective counterattack is a nightmare I don't think anyone in this room wants to contemplate.

That is why our members back the development of a missile defense, but also want one that is deployed sooner rather than later.

It will be America's strategic offensive systems coupled with workable defensive systems that will offer us the best hope of averting domination by the Soviet Union.

Because of their importance, we must never let up or be sidetracked in our efforts to field the best weapons possible.

SOVIET RECORD ON ARMS TREATIES

The Soviets, however, will do everything possible to lead us astray and lull us into somnolence with their promises of détente and arms control.

It is the false promise of arms control agreements that causes our members still more concern.

Just last week, the United States and the Soviet Union entered into yet another round of so-called arms control talks in Geneva.

Yet history shows the Soviets sign only two kinds of treaties, those obviously in their favor and those that they violate.

Clearly if the United States cannot take the Soviets at their word, then arms agreements must be truly verifiable.

But the truth of the matter is that, despite wishful thinking, real verification of arms control agreements is virtually impossible.

American satellites and reconnaissance planes do have the capability of photographing a license plate on a Moscow street. However, they cannot photograph what goes on inside a building, or a laboratory.

Even in the United States, agents of the FBI, with the full cooperation of local authorities, and with the freedom to go virtually anywhere they choose, are still unable to find major manufacturing facilities for illegal drugs or warehouses containing stolen goods.

Clearly, the difficulty of finding secret military facilities for the development and production of new weapons somewhere in the vastness of Russia, would be harder than finding a needle in a haystack.

Even if suspected cheating could be narrowed down to individual cities, what would be the chance of finding just the right building?

Both reconnaissance and onsite inspection would fail simply because America would not know where to look.

Before World War II, let us remember, Adolf Hitler was able to rearm Germany and put Europe on the path toward war despite the Treaty of Versailles, which included onsite inspection by multinational teams.

The only real guarantee of peace, of course, must rest on America's ability to deter aggression, regardless of what the Soviets or any other military power attempts to do.

Foreign aggression, of course, need not only be nuclear blackmail to seriously threaten the well-being of the United States.

SOVIET EFFORTS IN CENTRAL AMERICA

Today we need only look south of our border to Central America and Cuba to see the unfolding of a Soviet strategy that could have devastating consequences.

Nothing would please the Soviets more than to overthrow the pro-American governments in Central America and precipitate a refugee crisis that would send millions of refugees into the United States.

Should the Mexican Government also be overthrown because of the turmoil caused by millions of refugees pouring north to the Rio Grande, then the United States could have a hostile Marxist neighbor on its southern border.

Thus the Soviets could realize a strategic victory that would tie down American troops and erode America's ability to counter the Soviets in Europe, the Middle East, and Asia.

U.S. FINANCING OF ANTI-MARXIST MOVEMENTS WORLDWIDE

Our members believe that the fall of Central America and Mexico, along with the ensuing refugee crisis, can all be avoided if we spend relatively small sums of money now, rather than paying a much steeper price in the future.

Money should be specifically channeled to the pro-American Contra freedom fighters in Nicaragua.

It is time the United States reimposed the Monroe Doctrine, no foreign power will be allowed to use foreign or proxy troops to threaten America.

Until the day that Congress moves to uphold the Monroe Doctrine, all Americans will live under the threat of Communist expansion up to the Rio Grande, followed by millions of refugees pouring into America, along with economic strangulation and even military defeat.

In other parts of the world we should frustrate Soviet plans by supplying aid to the freedom fighters in Afghanistan, Cambodia, Laos, and Southern Africa.

The Soviets must be forced to feel the cost of their aggression against other people.

The support of pro-American freedom fighters, the crisis in Central America, the folly of so-called arms control, the deployment of a missile defense, the modernization of our triad, military readiness, and the threat that nondefense spending will squeeze out needed military dollars are all of great concern to our members and to the future of the United States as a free and independent nation.

Unfortunately, in recent years too many members of Congress have been basing their positions on defense and foreign policy on what they mistakenly believe are pragmatic political considerations.

SUPPORT OF DEFENSE POLICIES BY MOST AMERICANS

It is our position, however, that any Member of Congress who thinks that the American people are not willing to pay for a strong defense is dead wrong.

Recent election results make it clear that prodefense issues, once explained to the American people, receive overwhelming support.

Ex-Senators Frank Church, Birch Bayh, Dick Clark, John Culver, Tom McIntyre, George McGovern, Gaylord Nelson, Floyd Haskell, Vance Hartke, and Frank Moss, are examples of antidefense politicians who lost touch with the American people.

Walter Mondale's run for the Presidency is the most recent example of an antidefense candidate being soundly rejected by the American electorate.

Our members ask you to consider that almost three out of four Federal dollars are spent on nondefense spending, and that if cuts are to be made, they should be in the nondefense sector.

We urge you as members of the Appropriations Subcommittee on Defense to, at minimum, support full funding for President Reagan's original budget request and urge you to consider appropriating additional funds, beyond those requested by Secretary Weinberger for the basic areas covered earlier in this testimony.

Thank you.

[The statement of Mr. Walther follows:]

UNITED STATES
DEFENSE COMMITTEE

Statement By

Henry L. Walther
Executive Vice-President

Good morning:

Thank you for once again allowing me to testify before this subcommittee.

My name is Henry Walther and I am the Executive Vice-President of the United States Defense Committee.

The United States Defense Committee is a public interest organization dedicated to a strong national defense and foreign policy.

We are an organization of over 130,000 Americans who come from all walks of life; machinists, farmers, small entrepreneurs, doctors, lawyers, active and retired service personnel.

What binds all these people together is a concern that America's defenses are not what they should be.

They, and millions of other Americans are very concerned that Congress, over the last 20 years, has allowed the defense of this nation to fall behind the efforts of the Soviet Union.

It has been said that Congress is increasingly becoming the preserve of special interests, from the recipients of the welfare state, all the way down to the proponents of export/import specialty laws.

Well, there is one interest larger than all the others combined. It is not a special interest but is an interest that is shared by all Americans.

It's called national defense and is listed by the Constitution as Congress' first and foremost responsibility.

If the past is a guide to the future, however, pro-defense forces will have a rough time in this Congress.

Just two weeks ago, the Senate Budget Committee voted to slash President Reagan's defense request by $79 billion over the next three years.

At the same time that the budgeting ax was being wielded against defense, domestic programs were increased $20 billion above and beyond President Reagan's budget request.

In these times of financial hardship and soaring deficits it is of course important that every part of the budget be examined for savings.

Yet while Congress deals with the budget it is important to remember that defense spending unlike other areas in the budget must be determined by the external threat to our nation rather than some arbitrary dollar figure.

Our efforts must reflect the efforts of our adversaries.

And today the Soviet Union is continuing the most massive military build-up in history.

It is a build-up that has continued for over 20 years and shows no sign of let up.

The United States on the other hand allowed its military resources to be deflected by the conflict in Southeast Asia, and then through spending cuts mandated by Congress during the 1970's enforced a 10 year period of military stagnation and decline.

Only since the election of Ronald Reagan in 1980 has America started in earnest to rebuild her defenses.

Now just five years later, Congress is already taking the steam out of the rebuilding efforts.

In fact, the amount of money Congress has appropriated for defense since 1980 is less than the amounts President Carter had proposed to ask for should he have been reelected.

From fiscal 1983-85 Congress has cut over $100 billion from budget authority and outlays.

If President Reagan's 5 year military budget plan, presented to Congress in 1981, is examined we see that fully $150 billion has been cut out of intended military spending.

This year additional billions might be cut despite the fact that the 1986 Pentagon figures have been slashed by $36 billion in budget authority and $24 billion in budget outlays from last year's intended request for fiscal 1986.

Obviously, while the defense budget has increased, the rate of expansion has been seriously cut back.

It is also important to note that the cause of our national deficits are not the fault of defense, but have been caused by the explosion of non-defense spending.

In a phenomenon that was almost the exact opposite of Soviet spending patterns, the United States for twenty years increased the share of the national budget devoted to non-defense spending while defense spending accounted for an ever smaller amount of the budget.

During the 1950's and up until the early 1960's, defense spending hovered at 45% of the national budget; today it stands at 27%.

Meanwhile, non-defense spending skyrocketed from 56% of the budget in 1964 to over 70% in 1985.

A fact that this subcommittee should ponder is that if non-defense spending were scaled back to the proportion of the budget that it consumed in the early 1960's, there would be a $339 billion surplus.

A surplus so huge that the national debt could be largely paid off by the end of President Reagan's second term!

As Executive Vice-President of the United States Defense Committee, let me now outline to you several of the specific concerns voiced by the members of our organization in regard to the composition of the defense budget.

First, the United States Defense Committee's members, many of whom are retired military personnel, have expressed to me an uneasiness over the military readiness of our armed forces.

They have stated that if America is willing to station brave men and women at front lines around the world then we also must make sure that they have enough of the best equipment to deter any possible attack.

Soldiers without ammunition, backed up by pilots who don't have enough flying hours, and who are flying planes that are too often idled by lack of spare parts, is not the sort of deterrent that the Soviets take seriously.

America can be turned into a paper tiger in two ways: one by lacking the will to act; and the other by being unable to act.

In 1981, for example, 25 percent of army combat units were not ready for combat.

In the Navy 40 percent of major ships were not ready, as well as one-third of naval aviation squadrons.

In 1981, 25 percent of the Marine Corps' ground units were only marginally ready.

Steaming days for ships and battalion field training days were also alarmingly low.

During the past four years the number of major active and reserve units that are at least substantially ready has steadily increased but is still a far cry from what it should be.

American conventional forces should always be ready for crisis on any front.

Yet, Congress has continually slashed Administration requests for defense spending, and has focused their cuts on the so-called "soft spots" in the budget, namely military readiness, which is in fact the heart of America's ability to use conventional forces to protect vital interests.

In the area of strategic weapons, our members fully support the modernization of America's Triad: the B-1B bomber, the Peacekeeper missile and new submarines and missiles for our sea-based nuclear fleet.

Also, in the context of strategic weapons, our members wholeheartedly support the proposals by the Administration for the research and development of a ballistic missile defense.

The Soviet efforts to have a breakout capability in regard to a system of ballistic missile defense is a grave and ominous threat.

Recent deployment of several new Puskino phased array anti-ballistic missile defense battle management radars is just one step the Soviets have taken.

The deployment of SH-04 and SH-08 interceptor missiles is another step and constitutes a system of layered defense.

The modification of the SA-12 surface-to-air missile against ballistic warheads is also part of a layered defense.

With these technologies the Soviets potentially have an active missile defense system.

As it stands now, the Soviets already have the ability to destroy virtually our entire land-based missile force.

An America that is vulnerable while also unable to launch an effective counterattack is a nightmare I don't think anyone in this room wants to contemplate.

That is why our members back the development of a missile defense, but also want one that is deployed sooner rather than later.

Our founding President, Lt. Gen. Daniel O. Graham, USA (Ret.), along with a team of the best scientists and aerospace engineers in the country has shown that we can begin to deploy a missile defense almost immediately rather than waiting until the end of the century.

Their study shows that using off-the-shelf hardware and technology we could. in fact, have a missile defense system deployed in five years.

The importance of a missile defense, after all, would be its ability to prevent a war through deterrence.

Deterrence is the doubt created in the mind of the potential attacker of the possible success of an attack.

By the United States deploying a system of satellite-based and ground-based defense, Soviet planners would be unable to safely predict which missiles would leak through our defenses and thus deter an attack.

It will be America's strategic offensive systems coupled with workable defensive systems that will offer us the best hope of averting domination by the Soviet Union.

Because of their importance we must never let up or be sidetracked in our efforts to field the best weapons possible.

The Soviets, however, will do everything possible to lead us astray and lull us into somnolence with their promises of detente and arms control.

It is the false promise of arms control agreements that causes our members still more concern.

Just last week, the United States and the Soviet Union entered into yet another round of so-called "arms control" talks in Geneva.

Yet, clearly the history of arms control talks with the Soviets has been anything but positive.

In the past, other talks have been used by the Soviets to retard and stop the modernization of America's strategic deterrent while the Soviets have raced full speed ahead to first catch the United States and then surpass us in a variety of offensive and defensive strategic weapons systems.

Since the SALT treaties the United States has in effect stood still, and not deployed a single new type of intercontinental missile, or strategic bomber, while the Soviets deployed an entirely new generation of intercontinental bomber and churned out updated versions of older bombers, as well as deploying four new classes of intercontinental missiles and three new classes of ballistic missile submarines.

In 1983, for instance, the Soviets produced 150 new intercontinental ballistic missiles while the United States produced none.

Also in 1983 the Soviets produced 200 sub-launched ballistic missiles while the United States produced only 70.

In the area of strategic bombers they produced at least 35 while we produced none.

These so-called arms control talks have, in fact, not made the world safer, but have actually increased the danger of war by leading the United States down the path of military weakness.

A weakness that could lead Soviet leaders to miscalculate American resolve and bring on a nuclear conflagration neither side desires.

The past also offers faint hope that the Soviets want to negotiate in good faith.

History clearly shows that the Soviets sign only two kinds of treaties; those clearly in their favor and those they violate.

President Reagan, himself, has repeatedly sent reports to Congress that point to Soviet violations of arms control treaties with the United States.

The Soviets are, right now, in apparent violation of the following treaties:

- SALT I, by interfering with U.S. ability to accurately monitor missile tests,
- SALT II, by testing more than one new type of advanced intercontinental ballistic missile,
- the Anti-Ballistic Missile Treaty, by constructing a new ABM radar at Krasnoyarsk,
- and the Biological Weapons Convention, by conducting chemical warfare in Afghanistan, Laos and Cambodia.

Clearly if the United States cannot take the Soviets at their word, then arms agreements must be truly verifiable.

But the truth of the matter is that, despite wishful thinking, real verification of arms control agreements is virtually impossible.

American satellites and reconnaissance planes do have the capability of photographing a license plate on a Moscow street.

However, they cannot photograph what goes on inside a building, or a laboratory.

Even in the United States, agents of the F.B.I., with the full cooperation of local authorities, and with the freedom to go virtually anywhere they choose, are still unable to find major manufacturing facilities for illegal drugs or warehouses containing stolen goods.

Clearly, the difficulty of finding secret military facilities for the development and production of new weapons somewhere in the vastness of Russia, would be harder than finding a needle in a haystack.

Even if suspected cheating could be narrowed down to individual cities, what would be the chance of finding just the right building?

Both reconnaissance and on site inspection would fail simply because America would not know where to look.

Before World War II, let us remember, Adolf Hitler was able to rearm Germany and put Europe on the path toward war despite the treaty of Versailles, which included on site inspection by multinational teams.

The only real guarantee of peace, of course, must rest on America's ability to deter aggression, regardless of what the Soviets or any other military power attempt to do.

Foreign aggression, of course, need not only be nuclear blackmail to seriously threaten the well being of the United States.

Today we need only look south of our border to Central America and Cuba to see the unfolding of a Soviet strategy that could have devastating consequences.

While this matter has not yet entered fully within the jurisdiction of the Appropriation Subcommittee on Defense, it soon might.

The Soviet strategy is one laid out by Vladimir Lenin over a half century ago, and calls for the economic and political isolation of the United States as part of a campaign for Communist world domination.

Lenin called for the build-up of Communist forces while trying to isolate America from the raw materials needed for economic production, until America was weakened enough to fall into the Communist basket like an overripe fruit.

Cuban proxy troops, and the build-up of Communist forces throughout Central America are the tools used by the Soviets to isolate and weaken the United States.

Nothing would please the Soviets more than to overthrow the pro-American governments in Central America and precipitate a refugee crisis that would send millions of refugees into the United States.

Should the Mexican government also be overthrown because of the turmoil caused by millions of refugees pouring north to the Rio Grande, then the United States could have a hostile Marxist neighbor on its southern border.

Thus the Soviets could realize a strategic victory that would tie down American troops and erode America's ability to counter the Soviets in Europe, the Middle East and Asia.

Just last year, General Gorman, then Commander of America's forces south of the border, testified before the Senate Armed Services Committee that Mexico could very well become America's number one security problem.

Should Mexico and Central America fall then an estimated 10 million refugees would flee into our country costing the taxpayer $40 billion a year.

And then should Mexico station a hostile army on our border this Subcommittee would be forced to grapple with ways to find funds to fortify our border and increase the size of our army with hundreds of thousands of additional men.

Our members believe that the fall of Central America and Mexico, along with the ensuing refugee crisis, can all be avoided if we spend relatively small sums of money now, rather than paying a much steeper price in the future.

Money should be specifically channeled to the Pro-American Contra Freedom Fighters in Nicaragua.

By supporting the Contras we can at minimum tie down a sizeable part of the Nicaraguan army while providing the hope of freedom to the Nicaraguan people.

Tying down the Marxist Junta would also relieve military pressure on El Salvador, Honduras and Costa Rica.

But in addition to seeking a halt to the flow of arms from Nicaragua to the Communist guerrillas in El Salvador, our ultimate purpose, of course, should be to remove this Marxist cancer from Central America, allowing the Nicaraguan people the freedom they are now denied.

The Marxist cancer in Cuba should also be a target of the United States.

Unfortunately in the so-called Kennedy/Khrushchev accords the United States acquiesed to the imposition of a Communist regime in Cuba as long as nuclear weapons were kept out of Cuba.

Yet, since that time the Soviets have built bases for their nuclear submarines and use Cuban airfields as bases for nuclear capable bombers.

The United States must pressure Cuba to remove the Soviet bases.

Castro's use of Cuban troops as a proxy army for Moscow must also be stopped.

It's time that the United States reimposed the Monroe Doctrine.

After all, the idea of using bases in the Western Hemisphere to attack the United States is not just a product of the twentieth century.

It is in fact a strategy that was recognized by President Monroe in the 1820's because of Czarist expansion in North America.

To protect America from that threat President Monroe announced the Monroe Doctrine that declared North and South America off limits to foreign enemies.

The leadership of the Russian government has changed, but the threat remains.

Congress must openly declare that no foreign power will be allowed to use foreign or proxy troops to threaten America's underbelly.

Until the day that Congress moves to uphold the Monroe Doctrine all Americans will live under the threat of Communist expansion up to the Rio Grande, followed by millions of refugees pouring into America, along with economic strangulation and even military defeat.

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Thank you.

AREAS OF BUDGET CUTS IN DEFENSE SPENDING

Senator Stevens. Thank you very much.

I wish you had had a seat at the talk on Wednesday, but it was a little difficult to achieve what you suggest.

Senator Sasser, do you have any questions?

Senator Sasser. No questions.

Senator Stevens. Any questions?

Senator Rudman. I have one question.

Does your organization believe that in this $300-some-odd billion monolith that you generally support with all this procurement, all of the personnel and the tooth-to-tail ratio of 7 to 1, that there is any room whatsoever for any saving?

Does your group think maybe there might be a few billion dollars we waste or do you think it is all needed, every dime?

Mr. Walther. There are certainly areas that we can improve. Instead of spending $25 million extra to ship coal from West Virginia over to Germany where they already have plenty of coal, there are many places where we could save money.

According to the figures that we have seen, most of it, unfortunately, is mandated by one congressional committee or another in terms of various procurement procedures, et cetera.

Senator Rudman. I am talking about weapon system procurement, the number of personnel in the forces, the indirect force, auxiliary force.

Do you think we could go in there with a scalpel or meat ax and excise some of that fat?

Do you think every dime of the money being used for force structure and acquisition is necessary?

Is that your position?

Mr. Walther. Our position——

Senator Rudman. It is a simple question, yes or no.

Mr. Walther. I will try to answer without a yes or no, if that is all right.

Senator Rudman. You are the witness.

Mr. Walther. Our position is that the reason for the deficit is that nondefense spending has grown. The problem with cutting defenses like in a political campaign where it is said half of the money is wasted.

The problem is no one knows which half. If we don't have enough wheelchair ramps, life goes on. If we have a little bit less than adequate defense, life does not go on any more.

It is not worth taking a chance where you look where else to cut the budget.

Senator Rudman. I think that is a wonderful nonanswer.

Senator Stevens. Any other questions, gentlemen?

I want to apologize. When you started, two of my colleagues did the same thing I did, went to the wrong room.

VOTE ON MX MISSILE FUNDING

Senator Kasten. This afternoon the Senate is going to vote on the MX missile.

Will you tell us what you think the effect of a defeat of MX might be?

Mr. WALTHER. We have not thought a lot about that because we think we are going to win it this afternoon, according to our vote count.

Certainly defeat for the MX would give the Soviet Union absolutely no reason to negotiate. Frankly, we don't think that they are going to really negotiate in good faith anyway.

Certainly we must reconstitute and modernize our strategic deterrent. It is wearing out. We are taking down, I believe, one Titan every 45 days at this point and much like an old car, eventually you have to get a new model.

Senator RUDMAN. Thank you, Mr. Chairman.

Senator STEVENS. Thank you very much.

RESERVE OFFICERS ASSOCIATION OF THE UNITED STATES

STATEMENT OF REAR ADMIRAL ROBERT H. SPIRO, JR., UNITED STATES NAVAL RESERVE, EXECUTIVE DIRECTOR, RESERVE OFFICERS ASSOCIATION OF THE UNITED STATES

RESERVE READINESS

Senator STEVENS. The next witness is Robert H. Spiro, Reserve Officers Association.

Good morning. It is nice to see you again.

Admiral SPIRO. Thank you, sir.

Senator Stevens, I am Robert H. Spiro, Jr., Rear Admiral in the Naval Reserve, now the national executive director of the Reserve Officers Association.

It is a special pleasure to appear before this committee on behalf of reservist citizen soldiers of our country to express our views on Reserve readiness and national security matters.

In past years the Reserve Officers Association has recommended congressional action to provide better and more modern equipment for Reserve forces as an economical way in which to maintain adequate Armed Forces in a dangerous world.

That philosophy is just as valid today and the wisdom of action along these lines is just as apparently valid. It is well known that Reserve forces are the most economical source of units when they are properly equipped and trained.

At a time when the defense budget is under heavy attack, it would appear to us to be appropriate to increase reliance on Reserves. That means providing Reserves with suitable equipment.

EFFECTIVENESS OF RESERVE COMPONENTS

Dr. Lawrence Korb, the Assistant Secretary for Defense, Manpower, Installations and Logistics, is responsible for policy review and oversight of the total force. He recently made this short statement before the Manpower and Personnel Subcommittee, pointing out that Reserve components in general cost less than active components.

He also stated that the Reserve component is vital to our defense. The Guard and the Reserve provide significant support capability, for example, 70 percent of the Army's combat service support and 35 percent of the Navy's maritime patrol aircraft, and they participate in the maintenance and operations of all major

Air Force weapon systems except certain strategic weapons such as missile, bombers, and strategic reconnaissance.

Because the Reserves are totally integrated into the total force, they are essential to our warfighting capability, they will be used in any future war. They are required to meet our commitments to our allies.

I observe the tenor of the committee this morning with great interest and sympathy because we in the citizen-soldier reserve components believe that dollars can well be expended in an economical manner for Reserve forces and their readiness.

PERSONNEL GROWTH

Let me comment, since we represent all of the armed services, very briefly in summary today about the Reserve Forces item by item.

Thanks to the effective support of the Congress, the Army Reserve, Selected Reserve strength has grown by 20,000, from 266,000 in fiscal 1983 to 286,000 in fiscal 1985 while active component strength remains frozen.

As you well know, it is 781,000, there is a requested increase of 14,700 in the Army Reserve—pay drill strength, we recommend 9,300; full-time support, 4,000; individual mobilization, 1,400, for a total of 14,700.

The Reserve Officers Association supports the congressional decision to emphasize an increased role for Reserve components in the security of the country. We have full confidence in the ability of the Army reservist soldier to become an equal partner in the total Army.

SELECTIVE RESERVE INCENTIVE PROGRAM

ROA urges the Congress to protect its investment in the Army Reserve by extending the Selective Reserve Incentive Program. In keeping with the express sense of the Congress and the critical need to upgrade mobilization readiness, the Reserve Officers Association supports a modest increase of Active Guard/Reserve personnel by 4,000 in fiscal 1986.

To enhance the mobilization capability of 270,000 IRR, ROA recommends that the Congress authorize and fund a bonus program for this most valuable wartime personnel pool.

In just 1 year of operation the Army Personnel Center [ARPERCEN] has proven the wisdom of the thrust of Congress to have authority to manage Reserve matters delegated to Reserve components.

Under the command and management of the Chief of Army Reserve, the ARPERCEN has organized programs for managing and training almost 300,000 reserve members of the IRR and the Active Guard/Reserve and individual mobilization augmentees.

ROA strongly recommends, in accordance with the guidance of Congress, ARPERCEN, that the Chief of Army Reserve should assume responsibility for the balance of personnel responsibilities now vested in the Reserve Components Personnel Administration Centers.

Commensurate with the growing reliance on the Army Reserve and military planning, as attested to by the significant increases in Army Reserve planning at 574,000 in 1986, that equates to 37 percent of the total Army. More than one-third are reservists.

ROA very strongly recommends that the Chief of the Army Reserve be elevated to the rank of lieutenant general. We feel that his duties and responsibilities for more than 300,000 men make that important and mandatory.

In addition, ROA recommends that an additional Deputy Chief of Army Reserve be authorized at the two-star level and the commander of ARPERCEN be elevated to brigadier rank.

We further recommend that the full-time Reserve general office position be charged against the AGR strength organization.

These enhancements, in our judgment, would clearly be in consonance with the congressional mandate in Public Law 91-68 that Reserve chiefs be functional managers of their respective components.

BUDGET REQUEST

In summary, regarding the Army, we recommend approval in the fiscal 1986 budget request of $3.224 billion for the Army Reserve.

NAVAL RESERVE

Now, a few words about the Naval Reserve.

We commend Secretary Lehman and Admiral Watkins for their outstanding support of the Reserve. This is a new initiative in the 1980's. We strongly urge continued congressional support for this.

We also support for Reserve personnel Navy funding request of $1.354 billion to support the Naval Selective Reserve Category A strength at 118,209.

We recommend approval of $800,000 to pay $10 for drill incentive pay to enlisted reservists in designated high priority units, particularly on NRF ships.

We recommend to this panel the approval of an increase in full-time support personnel to 17,973. That is an increase of 2,000 over last year.

We recommend a Senate bill similar to H.R. 1442, increasing the deputy CNO's from six to seven, supporting a vice admiral as Chief of Naval Reserve for this position.

We recommend the continuation of the congressional program started last year as an add-on to procure two HH-60 helicopters for combat search and rescue. This would require an additional $12 million in the fiscal 1986 budget.

We recommend, Mr. Chairman, continued P-3C update procurement. The block obsolescence of P-3A's and B's will occur in the 1990's. We recommend approval of the Navy request for nine in fiscal 1986.

EFFECT OF BUDGET FREEZE ON RESERVES

Senator STEVENS. Let me interrupt you, if I may, because you have a little audience today which is not normal for these hearings, as you know. We will study your request.

Let me ask a couple questions and see if my colleagues have any questions.

We will put your statement fully in the record. Your organization has been very helpful to us. We have followed many of your suggestions in the period when we had increasing amounts of expenditures for defense and we have generally, I would say, accepted your recommendations on new initiatives for the Reserves.

Now, as I have said, I attended a meeting last night. I am convinced now, although I am not in support of it, I am convinced we are going to have a budget limitation of zero real growth imposed by the Congress, a freeze.

Have you thought about that from the point of view of what your organization will say as to the relative priorities of the areas within the Reserve?

Some of that cut is going to fall on the reserves, I hope less of it than on the active because we worked so hard to build up the reserves and I think it is more cost effective.

Have you studied from the point of view of what you would do if you were sitting in our chairs and had to apply a $21 billion cut to the President's budget?

Admiral SPIRO. Not in the intimate detail as you have with the broader perspective that you have.

For example, we perceive the need for P-3C's to be 12 to do the job that we believe is assigned. We have asked for nine.

We have tried honestly, consistent with the attitude that you have, which we share, and that is that the Reserves in particular and military Forces in general must be operated as efficiently and effectively as possible with the least resources to do the job.

Throughout my testimony and our extended report, which I believe is and hope to be, part of the record, we have tried honestly to recognize these realities for the good of the country because we are primarily taxpaying citizen-soldiers ourselves.

Senator STEVENS. I understant that. The difficulty is, as I read your testimony, you are asking for funds in addition, over and above the President's budget; isn't that true?

Admiral SPIRO. Yes, sir. In some cases we are, and in some cases we are not. We have tried to be as intelligently responsive to that national need as we can be.

RECOMMENDATION ON APPORTIONING BUDGET CUTS

Senator STEVENS. I would like to ask for your organization to really seriously consider giving us recommendations as to how to apportion that $21 billion cut. We face that problem within the next few weeks. I, frankly, think that it is going to be very difficult to do.

Senator Rudman has a very good suggestion. Others have suggestions as to systems that ought to be discontinued. Once we get a budget ceiling, it is binding upon us. We could not take the bill to the floor without facing a point of order if it exceeded the ceiling.

There will be a ceiling, I am certain.

Admiral SPIRO. The basic point that we in ROA would like to make is that, as an example, 50 percent of the medical support in time of war comes from Reserves, 63 percent and more of combat support for the Army, much of the transport by sea and by air comes from the Reserves.

We feel that the best buy that you gentlemen in the Congress can make is in a strong and viable Reserve Force.

Senator STEVENS. We agree with that. Again, I think you have to help us from the point of view that some of that $21 billion by necessity will fall on the Reserves.

Admiral SPIRO. We acknowledge that.

Senator STEVENS. I will give you a couple minutes to finish up and tell us what you have further in your statement that you want to emphasize and then I will turn to my colleagues.

MARINE CORPS

Admiral SPIRO. Very briefly, let me turn to the Marine Corps.

We feel that a viable end strength of reservists of 43,000 is not excessive, and I doubt if you would disagree with that, but the problem that pose of economies is still with us.

We urge horizontal equipment integration for the Marines and we think the same modernization should apply to the Marine air reserve as to the regular corps.

We would like to see the 10 KC-130 aerial refueling aircraft funded. We believe we need more than that. We would like to see two in the current fiscal year. There have been 10 in the last 5 years. We are talking about two aircraft here.

AIR RESERVE

With regard to the air reserve, the Air Force Reserve is especially cost effective and combat ready. All units can be mobilized in 24 hours and deployed in 72. These are reservists, not the active forces.

The Air Reserve crews last year flew 96,000 passengers and air dropped 37,000 troops and airlifted 80,000 patients and flew 70 percent of the hurricane missions in the gulf.

We feel this is not only a fine contribution, but we are suggesting adding eight C-130H aircraft for the Air Force Reserve as one of two requests we make for them and that they be given equipment for a bombing system.

GENERAL PERSONNEL ISSUES

Then, finally, our comments with regard to general personnel issues.

We would like to see some special medical pay for health care professionals in the Reserve as in the Active Service because 50 percent of the wartime medical care will come from reservists initially.

The GI Bill has had our support throughout. We believe Reserve participation is important in that.

We suggest military retirement be looked at as a tool in managing the military rather than as a pension fund that can readily be cut together with other issues because military people, as we all know, give up a good deal of their civil liberties for 20 or 30 years and their mobility and their separations and, of course, the call that some millions have had through the years to suffer in warfare.

So, in general, we would like to see a continuation of a viable Reserve Force that the Nation can rely on and we think it is the best buy.

[The statement of Admiral Spiro follows:]

PREPARED STATEMENT OF REAR ADM ROBERT H. SPIRO, JR.
EXECUTIVE DIRECTOR
RESERVE OFFICERS ASSOCIATION OF THE UNITED STATES

Mr. Chairman and Members of the Committee:

It is a pleasure to appear before this Committee. On behalf of the Reserve Officers Association, I wish to extend our thanks for this opportunity.

In past years, ROA has recommended Congressional action to provide better and more modern equipment for Reserve Forces as an economical way to maintain adequate armed forces in a dangerous world. That philosophy is just as valid today, and the wisdom of action along these lines is now obviously apparent.

It is well known that Reserve Forces are the most economical source of units when they are properly equipped and trained. At a time when the Defense Budget is under heavy attack, it would appear to be appropriate to increase reliance on Reserves, and that means providing them with suitable equipment.

Dr. Lawrence J. Korb, Assistant Secretary of Defense (Manpower, Installations and Logistics), is responsible for policy review and oversight of the total force. In his recent statement before the SASC Manpower and Personnel Subcommittee, he pointed out that the Reserve Components, in general, cost less than Active Components. He also stated:

> The reserve component is vital to our defense. The Guard and Reserves provide significant support capability -- for example, 70 percent of the Army's combat service support and 35 percent of the Navy's maritime patrol aircraft -- and they participate in the maintenance and operations of all major Air Force weapons' systems except certain strategic weapons such as missiles, bombers, and strategic reconnaissance. Because the reserves are totally integrated into the total force, they are essential to our warfighting capability and they will be used in any future war. They are required to meet our commitments to our allies.

As you know, the FY84 Defense Authorization Act created a new Assistant Secretary of Defense (Reserve Affairs). Once again, ROA applauds Congressional insight in its creation of this position. In many respects, the new position has already paid dividends for the Reserve Components. For example, when ROA testified in support of the elevation of the Deputy Assistant Secretary of Defense (Reserve Affairs), to a full ASD-position, we advised Congress that the DASD(RA) did not meet with the Secretary of Defense. Nor did he have a seat on the various policy boards that determined policies and resources affecting the Reserve. We are pleased to say that the first person to serve in this position, The Honorable James H. Webb, Jr., is meeting regularly with the Secretary. And he represents the Reserve viewpoint on numerous boards and committees.

Secretary Webb is also testifying to Congress on behalf of the Reserve Components he manages. Before the SASC Manpower and Personnel Subcommittee, he recently stated:

> Effective fighting forces are a product of equipment, training, cohesion, leadership, and individaul dedication. Under this administration, and with the firm commitment and support of the Congress, we have made vast strides in equipping and modernizing the Guard and Reserve. Much has been done in this regard but, because of past neglect and the increasing reliance on the Reserve Components, much remains to be done in the area of equipage.

The FY83 Readiness Assissment of the Reserve Components, issued by the Reserve Forces Policy Board last year advised that "Equipment continues to be the most serious and limiting factor affecting force readiness of the Reserve Components." The RFPB also reported:

> Comparing the Five Year Defense Plan (FYDP) for the period FY 1984-1988 and FY 1985-89, the Board notes the percentage of Reserve increased from 3.4% to 4%. This is an important improvement. The Board remains seriously concerned however, that the 15 year period still reflects a decrease in the Reserve Components' share of the Defense budget from 5.6% in FY 1975 to 4.0% in FY 1989.

With these general remarks in mind, it also should be recognized, as Secretary Webb told the Manpower Subcommittee, " The

Guard and Reserve have significant strengths in the areas of cohesion, leadership, and dedication." Reserve Components provide strong leadership in every aspect of life in all 50 states, the Commonwealth of Puerto Rico and U.S. possessions.

He added:

> Guard and Reserve leadership is provided by those same people who are leaders in the community, industry, and government. Thus, Guardsmen and Reservists in military leadership positions have ample opportunity to acquire and practice skills that are common to leadership in any circumstance, military or civilian. And finally reservists, particularly career reservists, are deeply dedicated to their country and the military which they serve. The rewards of Guard and Reserve duty, if measured in terms of dollars, are minimal. On the other hand, the demands of that duty are considerable.

I wish now, with your consent, to examine the Reserve Components by Services.

ARMY RESERVE

The Congress has been requested to provide $3.2447 billion in obligational authority to fund the Army Reserve's programs in FY86. The following chart compares the Army Reserve budget request for FY86 with obligations for the last two (2) years.

($ in Millions)

	FY84 ACTUAL	FY85 ESTIMATE	FY86 BUDGET REQUEST
Reserve Personnel Army (RPA)			
Excluding Retired Pay Accrual	1,322.0	1,559.3	1,792.5
Retired Pay Accrual	-0-	531.7	601.9
Total RPA	1,322.0	2,091.0	2,394.4
Operations and Maintenance	691.6	732.7	779.6
Military Construction	55.0	69.0	70.7
Total Program	2,068.6	2,892.7	3,244.7

The FY86 budget statistics substantiate the economic wisdom of the decision by the Congress to strengthen the role of the Reserve Components in our national defense. Thanks to the efforts of the Congress, the Army has frozen the strength of the Active Component, and systematically, is transferring to the Army Reserve viable roles, missions and management functions. The requested increase in FY86 to 300.4 thousand members in the Selected Reserve, from 285.7 thousand in FY85 indicates the ever increasing role being played by the Army Reserve. ROA applauds the Army for taking these cost effective measures, and has confidence in the ability of the Army Reserve citizen soldier to become an equal partner in the total Army.

ARMY RESERVE PERSONNEL STRENGTH

	FY83 ACTUAL	FY84 ACTUAL	FY85 ESTIMATE	FY86 BUDGET REQUEST
Paid Drill Strength	251.1	255.3	263.1	272.4
Active Guard/Reserve	7.0	8.8	10.7	14.7
Individual Mobilization Augmentees (IMA)	8.1	10.9	11.9	13.3
Total Selected Reserve	266.2	275.0	285.7	300.4
Individual Ready Reserve (IRR)	246.4	276.6	271.3	272.7
Total Army Reserve	512.6	551.6	557.0	573.1

The substantial sustained growth in USAR strength is a tribute to the effective support of the Congress. ROA continues to advocate for the Selected Reserve incentive program. Experience has shown that the payment of cash bonuses to individuals in selected military skills, and in high priority units, is one of the most cost effective retention tools in a volunteer military force. Retention of quality experienced soldiers increases a unit's combat readiness. We urge the Congress to protect its investment in the Army Reserve by extending the bonus incentive programs.

Full-Time Support

ROA supports the budget request to fund an end strength of 14,700 full-time USAR active duty personnel, an increase of 4,000 over FY85. The Congress recognizes the importance of Full Time Manning for enhancing USAR unit readiness. This is expressed in the Department of Defense Appropriation Act of 1985, Conference Report 98-1080.

> It is the sense of the Congress that the number of members of the Army Reserve and of the Army National Guard assigned to Full Time Manning only should be increased to 14 percent of the total membership of the Army Reserve and of the Army National Guard respectively, by FY89.

The budget request provides for a modest increase, which if approved will increase full time support to 6.7 percent, less than 50 percent of the goal.

Individual Ready Reserve

With a current pool of over 270 thousand volunteer members, which is anticipated to increase to over 370 thousand in FY90, the IRR represents a valuable asset, which upon mobilization will be used to bring active and reserve component units up to wartime strength. The Congress has recognized the importance of the IRR by extending military service obligations and providing an IRR bonus program. The bonus program has resulted in the highest historical rate of reenlistment of IRR soldiers, nearly 5,000 reenlistments in FY84, or 13 percent of the eligible population. The program is dynamic, with bonus eligible military skills changed in accordance with mobilization needs. To ensure continued strength maintenance in the IRR, ROA recommends Congressional authorization and funding for the IRR bonus program.

Army Reserve Personnel Center

In just one year of existence, the success of the Army Reserve Personnel Center (ARPERCEN), activated on February 3, 1984, as a field operating agency of the Office of the Chief, Army Reserve, has proven why the Congress on page 196 of a report accompanying the Omnibus Defense Authorization Act of 1984 stated,

> The Committee believes that Reserve Readiness would be enhanced if the Army, Navy, and Marine Corps delegated more authority to their respective Reserve managers.

Under the command and management of the CAR, Army Reserve Managers at ARPERCEN familiar with the unique personnel problems encountered by citizen-soldiers, have organized viable programs for managing and training the almost 300,000 members of the IRR, the Active Guard/Reserve, and Individual Mobilization Augmentees. Programs developed by ARPERCEN which are now operational include:

(1) Expediting of IRR soldiers recruited into Troop Program Units (TPU's)...Thirty-three thousand assignment orders were issued in FY84.

(2) Management of Lieutenants...In FY85 ARPERCEN will assign some 2,000 new lieutenants to TPU's, with a long term benefit of a stronger TPU officer corps, and better professional development of young officers.

ROA congratulates the Army for having taken this important first step in the process of transferring proponency for Army Reserve personnel management to the CAR. We believe the time has come to complete the process, and further enhance the management of Army Reserve personnel by transferring proponency for the remaining functions currently performed by the Reserve Components Personnel Administration Center to the CAR. It is a cost-effective measure, makes good sense from a management stand-point, and further implements the stated desire of the Congress to enhance the authority of the Reserve Chiefs. As one committee of Congress has said with respect to the creation of the Army Reserve Personnel Center as a field operating agency of the Chief, Army Reserve:

> The executive role of the Chief of the Army Reserve will be enhanced by his new responsibility for the management of the individual personnel assets of the USAR. The new executive authority is a welcome, but long overdue, addition to the advisory responsibilities of the Chief.

Senate Armed Services Committee, Report No. 98-174, 5 July 83, p. 195.

Command and Control

FY86 Army Reserve manning of 574,000 (37 percent of total

Army strength) and a budget with obligational authority of 3.2 billion (63% higher than FY84), attest to the increased reliance on the Army Reserve in military planning. Commensurate with the foregoing responsibilities and the growing importance of the Army Reserve to National Security, ROA strongly recommends that the Chief, Army Reserve be elevated to the rank of Lieutenant General. This enhancement, would clearly be in consonance with the Congressional intent of Public Law 90-168 that Reserve Chiefs be functional managers of their respective components.

In addition, ROA recommends that an additional Deputy Chief Army Reserve be authorized at the two star level, and that the Commander of ARPERCEN be elevated to one star rank.

We further recommend that full time Reserve General Officer positions be charged against the AG/R strength authorization.

NAVAL RESERVE

As ROA has often stated during the last few years, the support and direction provided by Secretary Lehman and the CNO, Admiral Watkins, have led the way in upgrading the Naval Reserve as a fighting force. The Navy's policy of horizontal integration of equipment into the Naval Reserve has proved to be highly successful. The introduction of front line ships--Knox and Perry class frigates, and soon modern Mine Warfare ships; front line aircraft--F/A-18s, A-7Es, F-14As, and E-2Cs,--is strong evidence of the Navy's intention to make "One Navy" a viable reality. ROA, in the strongest possible terms, urges continued Congressional support of these Navy initiatives.

As Navy Secretary Lehman stated during FY86 posture hearings, "...The Reserve must provide immediate augmentation to the active force in time of emergency across the entire spectrum of warfare. To implement that common sense policy requires providing the Reserve with equipment compatible with the active forces. For instance, instead of providing the Reserve only such equipment as it becomes obsolete and removed from the active force, there should be a parallel spectrum of new and old equipment reflected in the Reserve in the same proportion as in the active force..."

Last year ROA noted that the 1984 Naval Reserve Total Force Report to the Congress demonstrated a singular innovativeness and cooperation with Congressional intent. Indications are that the 1985 Total Force Report will be another positive document refining many of the initiatives contained in the 1984 Report and proposing additional areas for Naval Reserve participation, such as (1) formation of two Reserve supersonic "Aggressor" squadrons; (2) replacing two light attack squadrons with medium attack (A-6E) aircraft; (3) acceleration of Naval Reserve transition to P-3C aircraft, etc. The FY86 Navy budget submission does nothing to erode that confidence.

The Navy is to be highly commended for these initiatives. Several years ago, the Navy's support for, and appreciation of, the Naval Reserve was, for all practical purposes, non-existent. However, tremendous strides have been made and as ROA has stated repeatedly during the past two years, "The Navy now may well be in the forefront of all the services in support for their Reserve component."

I would now like to provide some comments about certain specific items in the FY86 program.

PERSONNEL

The Administration proposal to attain 118,209 Selected Reservists (Category A) by the end of FY86 is strongly supported by ROA. This number represents an increase of 8,209 (7.5 percent) over FY85 and will put the Naval Reserve paid strength at 95.1 percent of wartime requirements. The current Navy plan calls for a Category "A" Selected Reserve strength of 132,574 by the end of FY90, an increase of over 33,000 from the plan submitted three years ago. A truly remarkable and amazing turnaround!

Accordingly, ROA strongly urges approval of the Reserve Personnel funding request of $1.354 billion which will support an FY86 Naval Selected Reserve (Category A) strength of 118,209.

Even with increased personnel strength in the Naval Reserve, the manning of high priority units, particularly the NRF ships, remains a problem. A significant contributing factor to the manning problem is the rigorous training and long hours spent by the Reserve crew when the NRF ship goes to sea for the weekend. Such duty is not a "report at 0800, secure at 1700" type of drill found at many Reserve activities. The ship goes to sea for the weekend--crew members don't go home on Saturday night. In addition to the eight hours of rigorous training which takes place during the working day, watches must be stood around the clock when the ship is at sea. For all of this extra work, the NRF Reserve crew member receives no incentive, except the "joy of going to sea."

Accordingly, the Navy has submitted proposed legislation to amend 37 USC, "... to authorize payment of an incentive pay to enlisted personnel of the Selected Reserve who participate in certain units as designated by the Secretary of a Military department..." This proposed legislation would provide incentive pay of up to $10 per drill to those enlisted Reservists in units so designated--which would amount to $40-$50 per drill weekend. Such an additional amount seems somewhat less than dramatic in today's economy; however, a study conducted by the National Defense University indicated that a $10 per drill incentive would improve drill attendance and increase NRF ship readiness. With the increasing number of modern, front line ships entering the Naval Reserve creating even greater reliance on the NRF, full manning of these ships is a most critical need.

I understand that this proposal has been cleared by OSD as part of the DOD Legislative Program, and has been included in the FY186 DOD Legislative Contingency Fund at a level of $.8 million. The written proposal is waiting clearance at OMB.

ROA strongly urges passage of this legislative proposal and also recommends that the FY86 funding level of $.8 million be approved.

The FY86 RPN budget submission of $1.354 billion also includes an increase of full time support active duty (TAR) personnel from the FY85 level of 15,210 to 17,973. This increase of 2,763 represents necessary support for the rapidly growing Selected Reserve force (+828); the frigate program (+1,490); and aircraft squadron transitions (+445). ROA recommends that this requested increase in full time support personnel also be approved.

Along with this increase in full time support personnel, ROA also recommends approval of the requested TAR Selective Reenlistment Bonus. This bonus will be targeted at expanded ratings for NRF ships. While it will provide greater equity with USN shipmates serving on the same NRF ships, the amounts paid will still be less than that given USN personnel, since the NRF ships do not deploy.

One final personnel item involves HR 1442, introduced by Congressman Montgomery on 8 March 1985. ROA strongly supports this bill and requests introduction of a similar Senate bill which would authorize an increase in the maximum number of Deputy Chiefs of Naval Operations (DCNO) from six to seven in order to provide for a DCNO (Naval Reserve).

The Naval Reserve is an integral part of the Navy's total force in virtually every mission area. This role is expanding at an ever-increasing rate. Naval Reserve forces are being modernized to provide increased capability and ensure compatibility with active forces. The establishment of a Deputy Chief of Naval Operations (Naval Reserve) will improve the Navy's capability to ensure that the expansion of the Naval Reserve is accomplished in an effective and expeditious manner.

Implied in the establishment of a DCNO (Naval Reserve) is that, at some point, the incumbent would be a Vice Admiral. ROA strongly supports the concept of a Vice Admiral as the DCNO (Naval Reserve). We hope that some relief can be obtained from the current Vice Admiral ceiling so that both aspects of this very major change in Naval Reserve leadership representation can be effected. As a matter of interest, Secretary Lehman recently stated that next to the goal of a 600 ship Navy, a Vice Admiral DCNO (Naval Reserve) was his number one priority.

NRF FRIGATES/LAMPS I HELICOPTERS

The Navy plan to transfer modern, mission capable frigates to the Naval Reserve is proceeding on schedule. By 1990, eight FF-1052 Knox class and eighteen FFG-7 Perry class frigates will be in the NRF. Currently, six Knox class and three Perry class frigates are in the NRF, with two more Perry class scheduled to transition to the NRF later this year and four more in FY86.

One must remember, however, that these ships were Admiral Zumwalt's low end of the high-low mix. They're merely platforms with questionable capability of performing any mission without retrofitted sensors and weapons. We have always understood that these frigates are "programmed" to receive the AN/SQR-18 Tactical Towed Array Sonar System (TACTAS) and the LAMPS I ASW helicopter.

After a somewhat shaky start, LAMPS I procurement does appear on track, at least for now. Six were authorized and funded in FY84 and six in FY85; six more are requested in the FY86 budget.

We remain somewhat concerned, however, about the funding for TACTAS, although Secretary Weinberger stated in his FY86 Report to the Congress that all FF-1052s and all NRF FFG-7s would receive TACTAS. We have been told that the NRF FFG-7s will have both LAMPS I and TACTAS by FY88. Nevertheless, ROA remains concerned until we see an NRF TACTAS funding request contained in a budget submission to Congress.

Accordingly, we ask that the Congress ensure that these Naval Reserve ships are adequately equipped to perform the missions to which they will be assigned, particularly in the area of Tactical Towed Array Sonar and ASW helicopters. Both systems should be installed now, not in years to come. As part of this effort, we strongly recommend that Congress approve the six SH-2F LAMPS I helicopters requested in the FY86 budget and that the Navy be asked to provide an installation schedule (by hull number) concerning the retrofit of NRF frigates with TACTAS.

COMBAT SEARCH AND RESCUE

The only Combat Search and Rescue (CSAR) capability in the Navy rests in the Naval Reserve with aircraft which are approaching an average age of 25 years and are not survivable against today's threat. The Congress, recognizing this weakness in our warfighting capability, added $12 million in FY85 for the purchase of two HH-60 aircraft for the Naval Reserve CSAR, which will be delivered in July 1985. The HH-60 combines features of the UH-60A and the SH-60B to form a highly maneuverable, air transportable helicopter, capable of combat search and rescue.

Additionally, the Naval Reserve has the only Light Attack Helicopter (HAL) squadrons (HAL 4 and 5) in the Navy. As Congress has previously supported, the Navy plans to combine the CSAR and the HAL missions, creating two squadrons, instead of three, one at Norfolk and one at North Island. This plan requires nine HH-60s per squadron. Accordingly, the FYDP currently programs funding for three each in FY87 and FY88. However, there are no HH-60s requested for FY86.

In accordance with the Congressional recognition of this problem during FY85 deliberations, ROA strongly recommends that this vital modernization program be continued and that $12 million be added again in FY86 for the purchase of two additional HH-60 helicopters.

MARITIME PATROL AIRCRAFT

Last year we expressed concern that the Navy's Total

Force Report rejected the formation of Naval Reserve P-3C (ORION) hardware equipped squadrons and proposed instead the formation of Master Augment Units (MAU) in which Reserve training would be accomplished with Active Force P-3C aircraft.

ROA is most pleased to see that the Navy now plans to introduce P-3C aircraft into the Naval Reserve, as well as continuing the MAU program. The MAU program is a promising concept for the Naval Reserve and is very similar to the highly successful Associate Unit program in the Air Force Reserve--nevertheless, in and of itself, it is insufficient. However, the Chief of Naval Operations recently stated that introduction of the P-3C into the Naval Reserve Force is a high priority consideration and the Navy plans to have a P-3C squad ron in the Naval Reserve by FY88. Five of the squadron's nine P-3Cs are to be reassigned active assets and the other four will be FY86 production aircraft which are currently in the budget request. The CNO further noted that follow-on transitions for production P-3C aircraft will continue for the Naval Reserve at a rate of four aircraft per year, or one squadron every two years through 1993 when the active forces complete P-3C transition. After 1993, the Naval Reserve will transition one squadron (nine aircraft) per year.

The Navy is to be highly commended for expanding the policy of horizontal equipment integration into the Maritime Patrol community. Such action is fully supportive of Secretary Weinberger's stated policy of, "First to fight, first to be equipped."

The P-3C is the primary ASW system in the inventory. Accordingly, the P-3C rate of procurement is critical to maintain the force level and the operational effectiveness of our Active and Reserve forces. Twenty of the twenty-four active squadrons are currently equipped with the "C" model; the remaining four active and all of the Reserve squadrons now operate the older "A" and "B" models.

Because of the high rate of procurement of lightweight P3A/Bs in the early 1960s, these aircraft will reach their service life end-date in large numbers in the early 1990s. Unless the current programmed buy rate of P-3Cs is maintained at nine or more aircraft per year, transfer of newer aircraft from the active component will not keep up with the retirement of the Reserve aircraft caused by block obsolesence. Such a reduction in overall numbers of VP aircraft through retirement without replacement would seriously erode the Navy's ASW firepower.

The current Navy P-3C procurement plan of nine per year is a marked improvement over recent plans which called for only five per year. (Congress is to be commended for ignoring those plans and funding procurement of nine aircraft in the FY85 Appropriation.) Nevertheless, a procurement level of nine aircraft per year will still preclude an all P-3C Active and Reserve force until about 2009, and poses questions about adequate total force levels in the 1990s. Indeed, when asked during last year's hearings, "What production rate of P-3C aircraft would be necessary to replace the P-3As and lightweight P-3Bs as they reach the end of their service life, without incurring a reduction in the total force level?" Vice Admiral Schoultz, then Deputy Chief of Naval Operations (Air Warfare), responded, "Twenty-two per year."

Recognizing that a procurement rate of twenty-two per year was outside the bounds of fiscal reality, ROA joined with the Naval Reserve Association last year and strongly recommended a procurement level of twelve P-3C aircraft per year.

However, in addition to the nine P-3C per year procurement plan, the Navy now intends to commence service life extensions (SLEP) and avionics modernization of the P-3B (heavyweight) aircraft beginning in 1989, continuing through 1991 ($16-18 million per aircraft). These aircraft would be assigned to the Naval Reserve and would continue in the inventory until 2001. There are no plans to SLEP the P-3A or P-3B (lightweight) aircraft or to provide avionics modernization other than TACNAVMOD, which will be complete in FY86, or such other relatively minor modifications as necessary to provide a stopgap until the Reserve receives replacement P-3Cs.

The Navy appears firmly convinced that the nine per year P-3C buy, combined with the P-3B (heavyweight) SLEP/avionics modernization, will be sufficient to maintain a Maritime Patrol Force at the required level and capability. As noted earlier, however this plan does pose some questions: (1) Will sufficient "pipeline" aircraft be available to maintain the force level when required? (2) Are overhaul periods for each aircraft being taken into consideration, vis-a-vis required operating force levels? (We have heard that overhaul cycles are currently being extended significantly.) (3) The Navy five year plan shows only eight P-3Cs, not nine, being procured per year, FY88-90. (Nine P-3 type aircraft are planned for procurement each of those years, but one will be an RP-3D (oceanography) aircraft, not a P-3C ASW aircraft). How will this reduced P-3C procurement rate impact on the required Maritime Force Level? (4) Lockheed estimates a cost savings of 12-13 percent per year for multi-year procurement of 12-15 P-3Cs per year as opposed to 8.7 percent for nine per year. Is such a savings sufficient to warrant procurement at enhanced levels?

During the course of the FY85 DOD hearings, conflicting testimony was presented to the Congress about the required annual P-3C procurement rate; additionally, there are conflicting studies about Maritime Patrol Force structure requirements. The SASC directed that the Secretary of the Navy furnish, in conjunction with the submission of the FY86 Defense Budget request, a comprehensive master plan for modernization and maintenance of the Navy's air ASW forces, both in the Active and Reserve components. We understand that report is still in preparation.

Accordingly, in view of (1) the national deficit problem; (2) the Navy's strongly stated position that the current procurement plan is adequate; and (3) non-availability of the comprehensive Maritime Patrol report requested by the Congress, ROA will not at this time recommend enhanced procurement of twelve aircraft per year, as we did last year. We do reserve judgment, however, pending completion of the report and further analysis of the situation

However, in the strongest possible terms, we urge that the Congress support the Navy's plan for introduction of P-3C aircraft into the Naval Reserve; further, that the Navy's request for procurement of nine P-3C aircraft in FY86, as well as the requested funds for advance procurement of 33 P-3Cs under the proposed multi-year contract, FY87 - FY90, be authorized and funded.

MINE WARFARE/MINE COUNTERMEASURES

Today, the Warsaw Pact nations pose the greatest mine threat to the free world. the Soviets have emphasized mine warfare technology for generations and now possess the largest stockpile of mines in history and the largest force to deliver them. There is complete agreement that our present surface mine countermeasures forces are totally inadequate to counter this threat.

As a start towards closing this obvious gap, the contract for the USS Avenger (MCM-1), our first new mine countermeasures ship since the 1950s, was signed on 29 June 1982. Nine MCM-1 class ships have now been authorized and funded, and four more are contained in the FY86 Budget request. The first four ships are scheduled to join the NRF in 1987.

Being "high-mix ships," the MCMs are not only extremely capable, but expensive as well. Accordingly, the Navy is planning to augment this MCM force with 17 less expensive mine countermeasures ships which will be used primarily as minehunters (MSHs). The lead ship of the MSH-1 class was authorized and funded in FY84. Bell Aerospace Textron of New Orleans won the competition for the production of the lead ship, based on the revolutionary surface effect design.

ROA strongly urges that Congress approve procurement of the four MCM-1 and the four MSH-1 class ships requested in the FY86 budget.

CRAFT OF OPPORTUNITY PROGRAM (COOP)

COOP is a low cost force multiplier for the wartime mine countermeasures mission. This year the first six units were established using converted fishing vessels and former Naval Academy training craft (YPs). The Navy plans to convert four more fishing vessels and two YPs in FY86. This Reserve manned program is planned to grow to 22 craft with 88 crews, all enlisted, by 1990. Such a program provides a low cost augmenting Mine Countermeasures force which is sorely needed, given our almost overwhelming shortfall of MCM assets.

An extremely valuable peacetime training benefit is that the Reserve crews become intimately familiar with assigned ports and associated "Q" routes. Their continuing route surveys identify and record minelike objects during peacetime which will enable a much faster mine clearance during wartime.

However, rehabilitation of confiscated trawlers and other craft used in the drug trade has proven to be unexpectedly expensive--$800 thousand to $1 million per craft. Accordingly, the Navy is looking at other options, such as lease/buy, as a possible way to outfit the COOP program at lower cost.

ROA urgest continued Congressional support for this program as it evolves.

ARAPAHO

Previously, most of the discussion about ARAPAHO concerned a convoy protection program which places ASW helicopters on board merchant ships, although it was also noted that the concept is adaptable to other missions, such as mine countermeasures. Nevertheless, despite continuing Congressional interest, the Navy generally chose to ignore ARAPAHO for a variety of reasons.

However, ARAPAHO has finally surfaced in Navy planning--as a mine countermeasures platform. The Navy has programmed approximately $32 million in FY87 and $45 million in FY88 to construct two ARAPAHO facilities, one for each coast, to operate five RH-53 aircraft each in an Airborne Mine Countermeasures role.

ROA continues to support the concept of ARAPAHO for a variety of missions as a relatively low cost item. We still believe that its primary role will eventually be confirmed as a lower cost ASW force multiplier; we nevertheless welcome the current Navy initiative and urge Congressional support.

MARINE CORPS RESERVE

The Marine Corps Reserve is a major factor in the Total Marine Force, contributing one-fourth of the structure and one-third of the manpower. As has been the case for the last few years, the Marine Corps Reserve manpower requirements appear to be well provided for in the FY86 budget request.

ROA compliments the Marine Corps on their continuing recognition of the Reserve contribution and on their consistent support of the Reserve component. The Marine Corps Reserve Budget has reflected real growth every year since FY78. This support has enabled the Marine Corps Reserve to meet and usually exceed the OSD Program Guidance. Accordingly, ROA strongly urges approval of the Reserve Personnel funding request of $290 million which will support an FY86 Marine Corps Reserve Selected Reserve end strength of 43,019 (average strength 41,900). While these numbers are somewhat lower than those which were projected previously, this reduction resulted from a conscious decision on the part of the Marine Corps to eliminate marginal performers from their Reserve Component. This five percent reduction was accompanied, however, by a fifteen percent improvement in average job skill qualification and, concomitantly, an increase in readiness.

While this reduction has necessitated a revised manpower attainment plan, the Marine Corps, nevertheless, retains the goal of achieving full Reserve wartime strength by 1990.

ROA also strongly supports the newly established Marine Corps Reserve full time support program. Prior to 1984, such support was provided by regular active duty Marines. However, as is the case with all other Reserve Components, the Marine Corps recognized the value of utilizing a number of Reserve personnel to assist in organizing, administering, instructing and training the Reserve. The program started with 803 personnel in 1984, and keeping pace with Marine Corps Reserve development, is programmed to grow to over 1700 in 1989. We strongly urge Congressional support of this effort.

ROA strongly supports Marine Corps efforts to modernize the Reserve Ground Combat Forces. The "single acquisition objective" procurement program is designed to ensure that equipment upgrading occurs in Reserve units to correspond with active counterparts. Current planning calls for the introduction over the next few years of the Mark 19 heavy machine gun; the squad automatic weapon (SAW); the M198 155mm towed howitzer; the shoulder launched multi-purpose assault weapon (SMAW); the Light Armored Vehicle (LAV); the high mobility multi-wheeled vehicle (HMMWV); and other major items of modern ground equipment. We urge Congress to support these efforts and expedite this modernization process to the maximum extent feasible.

Unfortunately, the Marine Air Reserve is lagging far behind the ground forces in equipment modernization. The Fourth Marine Air Wing is severely limited in its capability to augment and reinforce the active forces due to aging aircraft, aircraft shortages, incompatibility between active and Reserve aircraft and block obsolescence. Unfortunately, the Marine Corps has not initiated a horizontal integration of equipment policy in their air Reserve program as has the Navy. Since the same rationale applies and since the Marine Corps is a part of the Navy Department, ROA does not understand the reason for this problem. The Marine Air Reserve should commence as soon as possible to replace aging and incompatible F-4s. While the

Marine Corps Reserve has a stated goal of having an all F/A-18 fighter attack force, the transition to F/A-18s is not scheduled to begin until 1991. In our opinion, that is far too late, particularly given the fact that Naval Air Reserve Units are already transitioning to F/A-18s. ROA urges Congress to direct implementation of horizontal equipment integration in the Fourth Marine Air Wing similar to that already underway in the Naval Air Reserve.

Congress has previously directed establishment of two Marine Air Reserve KC-130 aerial refueler/transport squadrons and further directed expedited procurement for this purpose. Ten KC-130 aircraft were funded for the Fourth Marine Air Wing as Congressional add-ons in FY82, FY83, FY84, and FY85. None are requested in the FY86 budget, therefore, still leaving a total of ten KC-130s to be procured to meet the Congressional mandate. ROA recommends additional funding be added again this year to procure two additional KC-130 aircraft for the Marine Air Reserve.

The Marine Corps has developed long range plans to upgrade the capabilities of the Marine Air Wing. The intent of these plans obviously is laudable. However, as noted earlier, they are far in the future and depend on too many variables. ROA strongly urges the Congress immediately to commence authorization and funding for this long overdue modernization program as the most critical need for the Marine Corps Reserve.

AIR FORCE RESERVE

The Air Force Reserve (AFR) has achieved new levels of strength and readiness during the past year. In FY84 it attained and end strength of 70,318 versus a programmed 69,880. Despite an increase of more than 3,000 people during the year, quality was maintained with 97 percent of all non-prior service enlistees high school graduates. This is a seven percent increase over FY80. The efficiency of the Reserve recruiting program as well as the dedication and hard work of the unit commanders and supervisors is reflected in this accomplishment.

In FY86 an average Selected Reserve strength of 75,600 is requested, a 2700 increase over FY85. This reflects the military personnel requirements for aircraft modernization and additional units. The AFR's Force Structure units increase in number from 220 in FY85 to 229 in FY86. These include flying units, aerial port squadrons, and civil engineering units. It is gratifying to note that the Air Reserve Forces (AFR plus Air National Guard) provide nearly 25 percent of all Air Force flying and mission support capability with only 7.9 percent of the budgeted military personnel dollars($1,618 million of $20,412 million). It is obvious that the Air Reserve Forces are a real bargain in the total force.

The Air Force Reserve is not only cost effective, it is a combat ready, fighting force. Exercises and real world contingencies during the past year have again proved that all AFR units can be mobilized in 24 hours and deployed within 72 hours. With the exception of two units with major aircraft depot maintenance schedules, all equipped flying units are combat ready.

A full spectrum of meaningful missions are performed by the Air Force Reserve. As Reservists train, they often support requirements that would otherwise have to be met by the active force. In FY84 AFR equipped units flew 96,631 passengers and airdropped more than 37,000 troops as part of their normal training missions. In addition, AFR associate C-141 and C-5 units flew more than 82,000 hours and associate aeromedical evacuation units airlifted more than 80,000 patients. Air Force Reserve rescue and recovery units were officially credited with saving 26 lives. During the same period the AFR weather group flew more than 70 percent of all hurricane missions in the Gulf of Mexico.

Among the key personnel in maintaining mission unit readiness are the Air Reserve Technicians (ARTs). These dual status individuals provide the day-to-day management and continuity of their units while performing in their civilian capacity. As military members of their units, they train other Reservists during active and inactive duty training periods. The high skill level and stability of these employees is critical in sustaining the Air Force Reserve's operational readiness. With respect to mobilization readiness, a small number of ARTs who have, through no fault of their own, been separated from their military assignments, must be continued indefinitely in their civil service positions as "status quo". In an effort to eliminate this problem, changes have been initiated to Title 5 and Title 10 U.S. Code. Last year this Committee was responsible for providing temporary relief in the FY 1985 DOD Continuing Resolution Authority (CRA) Appropriations Act. Permanent legislation is being requested this year. We thank you for your action last year, and urge your continued support to ensure that the AFR Technician Force is mobilization ready at all times.

The Air Force continues to modernize the AFR with newer aircraft and equipment. This year the first C-141 equipped AFR strategic airlift unit will be established at Andrews Air Force Base, Maryland when the C-130E wing converts to C-141 aircraft. The AFR will provide 100 percent of the aircrews and maintenance personnel for its equipped strategic airlift units. In addition, the AFR will continue so supply 50 percent of the aircrews and 40 percent of the maintenance force for the C-141s and C-5s in the active force fleet through the associate program.

However, on the tactical side, the picture is not as bright. While the first Air Force Reserve F-16 aircraft have been received at Hill Air Force Base, Utah, and new production line F-16's are scheduled for Luke AFB, Arizona in FY87, the conversions programmed for the Air Reserve Forces (Air Force Reserve plus Air National

Guard) through FY90 are dependent upon the planned F-15 and F-16 procurement levels. We are concerned that reductions in procurement levels will dictate that the AFR F-4D aircraft remain in the inventory even longer than currently programmed. Consequently, we urge your support of funds to make desired modifications of these F-4s so that they will remain survivable in combat in the late 80s. Last year procurement funds were recommended by this committee to provide smokeless engine kits and off-boresight AIM-9L capability for all AFR F-4's. We commend the committee for its foresight and ask that funds be committed this year to finish the job by equipping these F-4 aircraft with an improved bombing system.

When we look at the tactical airlift force we see that the AFR C-130A fleet averages 28 years of age with no replacements scheduled until the 90s. Even than, replacement is contingent upon the timely procurement of the C-17. We support the C-17, but are concerned that program delays could leave the AFR with no replacements for 35 year old C-130As comprising 20 percent of the tactical airlift force. In the past, Congress has appropriated funds for 72 C-130H add-on aircraft for the Air Reserve Forces, but only 16 of these 72 have been for the Air Force Reserve; the other 56 have gone to the Air National Guard. Currently, the AFR has more A models than the ANG and the imbalance will grow as previously procured aircraft are delivered. We believe that equity and sound operational considerations dictate that the Air Force Reserve share in any further C-130H add-on aircraft procurement,as was the case last year. The Congress has recognized the need for these add-on aircraft and we urge that the program be continued this year.

In summary, the Air Force Reserve's wartime mission is expanding. With your continued support in providing modern equipment and training, the AFR will continue to maintain its superb readiness and combat capability.

GENERAL PERSONNEL ISSUES

POTRAL TO PORTAL COVERAGE

ROA was very pleased to see the action taken in the last two Defense Authorization Bills to provide increased medical coverage for reservists who become ill or are injured while traveling to or from training or while participating in weekend drills. This is an important step forward in providing essential medical coverage for drilling reservists. However, we recommend that the committee thoroughly review the statutes regarding health and disability coverage for reserve personnel. As you know, the benefits and entitlements for reservists will vary by the period of time the member is ordered to active duty. The reservist who is on active duty for a period of less than thirty days, and who becomes disabled or dies while on that short tour of duty, may not have the same benefits as his active duty counterpart. With the increased participation of Reserve units in hostile environments such as Granada, it is important that there be an equalization of medical, disability and survivor benefits between the active and reserve component members.

HEALTH CARE PERSONNEL

The Assistant Secretary of Defense for Reserve Affairs has testified that more than fifty percent of all the personnel required to provide war time medical care will come from the Reserve Components. In spite of the heavy reliance that our nation is making upon the Reserve Components in the vital area of health care, legislation has not been enacted to provide special pay for Reserve Component health care professionals. When Congress enacted PL 96-284, which provided special pay for active duty health care professionals, the Reserve Components were not included. We believe that a special pay incentive program would have the same beneficial effect on recruiting and retention for the Reserve Components that PL 96-284 has had for the active duty force. If such heavy reliance is going to be placed upon the Reserve Components to provide half of the war time medical care, legislation to address the shortages that currently exist in the Reserve Component health care professional area should be delayed no longer.

GI BILL

ROA was very pleased to see the Congress pass a new GI Bill last year. We view this as a valid means of improving both the quality of recruits and the ability to retain needed personnel in the active and reserve forces. The legislation that was enacted last year has a starting date of 1 July. We support an earlier starting date for the new GI Bill. The 1 July effective date will cause individuals who are seeking to enlist to delay such actions until the program starts. Such a delay will adversely affect the orderly flow of personnel into the training base. We would also like to see the legislation modified to permit participation in the program by Selected Reserve members who have earned a bachelor's degree. In addition, the contribution schedule should be changed to permit a smaller monthly deduction over a longer period of time and inclusion of a provision permitting refund in appropriate cases.

COMMISSARY PRIVILEGES

ROA was pleased to see Congress direct the Department of Defense to conduct a test program in which a limited number of Selected Reservists were allowed, at their convenience, up to fourteen commissary visits a year. The test was conducted last year and was very favorably received by the Reserve community. We understand that the modified entitlement influenced individuals to reenlist in the service and thus served as a positive no cost retention factor. We also understand that the impact of the test on commissaries was minimal in the test areas. We look forward to seeing the program expanded to provide all members of the Selected Reserve the opportunity to exercise their commissary privileges in the same manner that they currently use their post exchange privileges.

In addition, ROA believes that exchange and commissary privileges should not be lost to those who are transferred to the retired reserve after completing twenty or more qualifying years of servive. Reservists in this category are in a limbo status until they reach age 60 and become entitled to pay and other benefits associated with military retirement. It would be a low cost benefit to extend post exchange and commissary privileges to these pre-age 60 reserve retirees and would serve as a valuable retention tool for the Reserve Components.

MILITARY RETIREMENT

Although the FY86 budget submitted by the administration contains only one proposal specifically addressing military retirees, i.e., the elimination of the Cost of Living Adjustment (COLA) scheduled for 1 December 1985, ROA is concerned over the proposals affecting civil service retiree COLA's that could affect the military retiree. The administration's proposal to cap civil service COLA's in future years at the lower of the consumer price index (CPI) or the federal pay increase, and then apply that lower COLA to the first $10,000 of retired pay and 55 percent of the lower COLA to amounts over $10,000, if enacted into law, will apply to military retirees unless specific delinkage language is included in the legislation. The means testing philosophy that rests behind the application of such a formula to earned staff retirement programs causes us great concern. We hope the Congress will reject this new philosophy and preserve the principle that retired pay should retain the purchasing power present at the time of retirement.

Although the administration's FY86 budget submission contains no major restructuring of the military retirement system, we feel it necessary to state again that a series of piece meal erosions in the value of military retirement have been and are still taking place. And these changes are being made without a thorough analysis of the impact that they can have on our nation's ability to attract and retain the personnel needed to adequately man our defense structure. It is estimated that the changes which have been made to military retirement since 1980 alone will decrease the lifetime retirement pay by approximately 20 percent for those fully affected. Unfortunately, changes of this magnitude have not slowed down the attacks on the military retirement system and are often completely overlooked by those who speak or write against military retired pay.

For the U.S. Armed Forces, the military retirement system is a vital manpower management tool which permits the retention of a young force with the experience and skills necessary to meet our worldwide national security obligations. From the individuals point of view, retirement is part of the economic security package that the service member counts upon during his years of service with its attendent personal and financial hardships. Miltiary retirement is the number one factor in the reenlistment of our career personnel. It should also be noted that military retirement is becoming of increasing importance in the initial enlistment decision. In the all volunteer environment, and with a decreasing youth population, further changes to the current system could well result in our Nation's inability to attract and retain the quality and quantity of personnel needed to meet our defense committments.

The current military retirement system has proven to be effective in being a force management tool and in providing a form of economic security for those who are willing to endure for a minimum of twenty years the hardships, the separations, the loss of many personal civil liberties, and the possiblity of facing armed conflict. We therefore urge this committee to carefully evaluate the long term impact of any proposed changes to the current military retirement system. The cost of misjudgement as to the impact of changes can have severe national security ramifications.

Thank you for the opportunity to appear before this Committee. Your support for the men and women in uniform, Active and Reserve, is noteworthy and sincerely appreciated.

I will be happy to answer any questions that you might have on these issues.

VALUE TO TAXPAYERS FROM RESERVE FORCES

Senator STEVENS. Thank you very much.

Senator Sasser.

Senator SASSER. Thank you, Mr. Chairman.

Mr. Chairman, I really have no questions of the admiral. I would make this statement.

I, myself, agree with much of what the admiral has said today about the Reserve component and that being a good buy for the taxpayers.

From my experience, if I might make a personal reference, Mr. Chairman, as a former member many, many years ago of the Marine Corps Reserve, I felt that the taxpayers were getting an awful good buy out of what we did back in my younger days.

The Reserve is a great way, I think, of nurturing and keeping current skills the taxpayers might have paid a lot for. Individuals went on active duty and then transferred into the Reserves.

I simply mention that by way of saying, Mr. Chairman, that this is one Senator who is a strong supporter of a strong Reserve. I think it is exceedingly cost efficient and something that we ought to support.

Thank you.

Senator STEVENS. Thank you, Senator Sasser.

Senator Rudman.

AUXILIARY SUPPORT SERVICES

Senator RUDMAN. My only comment on the proposal I have made is that I believe we can quite readily reduce some of the indirect auxiliary support forces of which there are enormous numbers in the Armed Forces, both civilian and military.

In fact, put some of that money, if you will, into Reserve Forces at a return ratio that is probably close to 5 to 1 and get the same kind of support as the auxiliary Services.

I support what you have said, probably philosophically get the people in DOD and all the services to make that commitment. Obviously, given the choice, they prefer the Active Duty Forces for all sorts of reasons, having little to do, in my view, with real readiness.

A lot has to do with the number of slots you have for various ranks, and so forth and so on. It is a very interesting situation that I have investigated in the past 6 months. The numbers are staggering.

There are 3.1 million people employed by DOD of whom about 1.1 million are civilians. Of the 3.1 million, 700,000 people are clearly identified with Strategic Tactical Mobile Forces; 2.5 million are direct military support, many in uniform.

I believe many of those functions could be performed by the reserve.

I think, if my proposal gets to see the light of day in the U.S. Senate and the Congress, it may well be as part of something that will strengthen the Reserve, which I would support.

Admiral SPIRO. Mr. Chairman, may I respond with a sentence or two?

Senator STEVENS. Yes.

COMMITMENT TO RESERVE STRENGTH

Admiral **Spiro**. I am one of the citizen-soldiers and sailors, myself. I have spent a lifetime in academe as a professor, dean, and president. I have been drilling off and on the side in spare time for 32 years with 1 year of drill pay.

So, I have great personal sympathy with the points you make. During the 1950's, 1960's and much of the 1970's the active component leaders were not at all sympathetic to the total force concept.

I would like to suggest today that the Secretaries of the several services, whom I know personally, and chief of the military, whom I know personally, are really committed to the Reserve strength.

I think the point you make is beginning to take effect. The total force idea has been accepted. I served in World War II as a youngster aboard a destroyer. There were two regular officers and 26 reservists. The same proportion followed in the enlisted ranks at that time.

We cannot have a viable force without reservists and it is the best buy.

Mr. Rudman, I don't believe you would aver that the reserve components have the civilian support. We simply don't and we don't want it.

Senator **Rudman**. Thank you.

Senator **Stevens**. Senator McClure?

Senator **McClure**. No questions.

Senator **Stevens**. Senator Proxmire.

Senator **Proxmire**. No questions.

Senator **Stevens**. Thank you very much. We appreciate it, Admiral. Your full statement will be in the record.

We will welcome those comments I have suggested you should make.

DEMOCRATS FOR DEFENSE

STATEMENTS OF:

JOHN G. KESTER

FRANKLIN D. KRAMER

CONTINUED REAL GROWTH IN DEFENSE BUDGET

Senator **Stevens**. Mr. Kramer and Mr. Kester on behalf of Democrats for Defense.

Senator **Kester**. Thank you, Mr. Chairman.

Good morning, Mr. Chairman and members of the subcommittee. My name is John Kester. With me is Franklin Kramer. We are testifying before you this morning on behalf of a group called Democrats for Defense which is a group of members of the Democratic Party who are concerned with national security issues in particular, many of whom have held senior positions in the Defense Department over the years.

We have a statement which we would, with your permission, submit for the record, Mr. Chairman.

Senator **Stevens**. It will be printed in full in the record.

Senator **Kester**. Thank you sir.

Also, with your permission, Mr. Kramer will summarize it briefly. In particular, he will emphasize those parts which we hope may respond to some of the questions that you, Mr. Chairman, and Senator Rudman and Senator Proxmire and others have asked in the course of the hearing this morning.

We offer this in a spirit of constructive help if we can provide that to you. We recognize the difficulty of the budgetary problems which you are facing right now.

We also recognize there is no single set of answers to those problems.

So, with that, I will turn it over to Mr. Kramer.

Mr. KRAMER. Thank you very much, Mr. Chairman and members of the committee.

As you will see in our prepared statement, we favor a continued real growth in the defense budget.

Bowing to the realities of the statements made this morning, I will not further belabor the point other than to say in the context of understanding the overall economic and political situation, cuts may have to be made in all aspects of the budget.

We think that when the Senate and the Congress look forward to make what undoubtedly will be cuts, one of the critical things is that you do it in the context of a strategy and understanding of where we want to get to.

EMPHASIS ON LAND, AIR, AND MOBILITY FORCES

In our view, one of the difficulties in the last 4 years is that the strategy has been inappropriate. There has been an overemphasis, in our view, on nuclear and maritime forces at the expense of land and air and mobility forces.

For us, I think all of us, the critical regions are Europe, the Far East and more recently the Persian Gulf. It is widely accepted that NATO's conventional forces could only last a few weeks against a Soviet conventional attack, but we don't see that, despite 4 years of very large budgets, that the administration has improved U.S. capability sufficiently or has caused our allies to do so, that we have a better balance than when we started before.

In the Persian Gulf, for example, we find we have no real new capability. Our ability to move forces to Europe and the Persian Gulf is enormously deficient.

What we have gotten is a big naval buildup which, in our view, is nice to have, we don't oppose the naval budget per se, but we think as opposed to other things we could have had, it is less useful than other kinds of expenditures that should have been made and can still be made.

REALLOCATION OF FORCES

We think what we would do is urge a reallocation of forces to more urgent needs.

We are going to give you a list that we think would suggest cuts that can be taken by the committee consistent with the emphasis that we have on improving the land, air, mobility forces, reducing the overemphasis on strategic and naval forces.

What we urge you not to do and what we have seen happen, both when we were officers and over the years is to have funds cut arbitrarily from operations, maintenance, spare parts, and ammunition. These are the funds that generally don't have political constituencies. They are funds that when you cut, you cut real capability. They are the easiest to knock out and they hit at outlays in the first year.

We urge you to do all you can consistent with reality to avoid cuts along those lines.

What I would like to do then is to mention some large dollar deletions and then some things that we would suggest adding to the budget.

STRATEGIC DEFENSE INITIATIVE

In the strategic nuclear arena our first suggestion would be to slow, not halt, the strategic defense initiative. What that really is now is a research effort. It has increased from $1.4 billion to a proposed $3.7 billion. That increase in 1 year is impossible to imagine, in our view.

We would suggest, due to the enormous complexity of the program, the difficulty of the problems that everyone agrees are to be faced, that the reduction be on the order of $1 to $2 billion.

Senator **Sasser**. SDI?

Mr. **Kramer**. Yes, sir.

B-1 BOMBER

We would suggest that you take a very close look at the $6.2 billion proposed for the B-1 bomber. Some of our group favored terminating that program entirely. All of us would at least favor slowing it down.

That would help the current budget deficit, keep the production line up longer. It would cut down the pressure that would come later, when the line goes down, to keep manufacturing the B-1.

Senator **Stevens**. Multiyear contracting?

I thought that was multiyear contracting. It is an obligation and we must fund that contract.

Are you familiar with that?

Mr. **Kramer**. I am not intimately familiar with the contract, of course, Senator.

As a general proposition, I think you are right. As a general proposition, I also note in the past the Pentagon has tremendous budget capability with the contractors, but I won't disagree with your point.

MX MISSILE

We would suggest that the $3.2 billion for the MX missiles be slowed. Some of us would favor terminating the program entirely.

NAVAL FORCES

In the naval forces we would suggest that having bought two new carriers, we nonetheless decide to hold the carrier force at 13.

We would save enormously on the associated ships and aircraft that would otherwise be required to go to a 15-carrier force.

Carrier battle groups, in our view, are not the top defense priority.

We also suggest halting the DDG-51 advanced funding and battleship advanced funding.

MISSILE SYSTEMS

Another program we suggest you might look at is the Maverick missile which has several target acquistion problems; AMRAAM which is far too expensive, a million and a half dollars a copy; Divad which might be slowed or canceled. Right now it is enormously expensive and does not seem to work very well.

AIRCRAFT

We would also suggest that the F-15 proposed purchase of 48 be eliminated and F-16's be substituted. You can get more aircraft, they cost less. You can get greater capability. We think we have enough F-15 capability, but you could have substantial additional aircraft.

Finally, if you are going to be serious about cuts, we urge you to take a look at the unnecessary military bases that are around the United States. We think that over a short period of time you could save on the order of $2 to $3 billion.

We also recommend, and realize this is difficult in a year of declining expenditures, that there be some increases to offset the decreases.

LIGHT INFANTRY DIVISIONS

The Army is proposing to acquire two new light divisions. We think that is a good idea. Those light divisions lack mobility.

We recommend that they purchase a vehicle along the lines or, or maybe the exact vehicle, the light armored vehicles owned by the Marines.

Over time we would recommend that the Army acquire an additional two divisions. We think that the greatest deficiency which now exists in NATO is the lack of forces. We don't think we can do that alone. we have to have a NATO program. We have to bring our allies along.

We think we must lead by example and we propose adding two new divisions as long as we can get the necessary support from our allies in manpower, ammunition and logistical supplies, all the things necessary to create a force.

In the air we would propose the F-16 rather than the F-15.

MOBILITY FORCES

In the mobility forces we would have a ceiling. The greatest single problem we face is that we cannot get our forces to where they must go quickly enough. The administration has proposed increase in mobility. We would suggest doing more.

PENTAGON MANAGEMENT

Finally, I would like to say that we think there is a lot that can be done with respect to the management of the Pentagon. We think that the administration has paid attention to some of the small improprieties in the procurement process, but it has not paid attention to the overall process.

It has a program that it creates by asking the four services what they would like to purchase instead of having an overall strategy.

They have added to the bureaucracy by adding assistant secretaries in OSD, now 11 compared to 6 in 1981.

They have not responded to the fairly universal criticism of the Joint Chiefs of Staff system. Former members of the JCS, six former Secretaries of Defense and other high officials, going back 20 years, have said the JCS system does not work, and the administration does not propose to reform it.

We suggest that it is really up to you on both sides of the aisles to do something sensible.

We have a few suggestions on management, one, of course, is reform of the JCS.

Another is that we would suggest that the Pentagon staffs be cut. There is no exact figure that one could use, but an example would be to cut one-quarter of the personnel above the clerical level and secretarial and have substantial cuts in OSD.

MILITARY RETIREMENT PAY

Another reform is the military retirement pay. What we need to do is maintain the faith of those who have been in the service, but at the same time reduce future automatic increases.

Finally, we would suggest with respect to bases, that you might fund only the close-out costs of specific bases.

I appreciate the opportunity to testify and will be happy to answer any questions, Mr. Chairman.

[The joint statement of Mr. Kester and Mr. Kramer follows:]

Joint Prepared Statement

JOHN G. KESTER AND FRANKLIN D. KRAMER
ON BEHALF OF
DEMOCRATS FOR DEFENSE

Mr. Chairman and Members of the Subcommittee:

We are grateful for the opportunity to be heard briefly this morning on the Administration's proposed Defense appropriation for Fiscal Year 1986. We are testifying on behalf of ourselves, and also as two members of Democrats for Defense.

Democrats for Defense is a group of lifelong adherents of the Democratic Party who have a particular concern to maintain this country's national security posture, without neglecting the soundness of our economy and the fairness of our society. Most of the members of our group, including ourselves, have held senior positions in the Department of Defense. Our statement today reflects a general consensus of outlook of the group, although it has not been formally adopted, and not all the members are necessarily unanimous on all details.

We shall confine ourselves to three basic issues:

1. How large should the Defense appropriation be for FY 1986?

2. How can the funds the Congress appropriates be sed the most effectively?

3. What improvements in management and efficiency should you be demanding from the Pentagon in return for all the money you are going to be handing over?

Size of the Defense Appropriation

President Reagan is asking you for new obligational authority of $313.7 billion, which after adjusting for inflation is a 5.9% increase over last year's defense appropriation. Some of the programs that make up that total we believe are bloated, as we shall highlight in a moment. But we do not believe that the total figure is far out of line with what the safety and security of this country require.

The U.S. defense effort reflects the interplay of several factors: the degree of threat that the United States and its allies face; the nature and cost of the steps necessary to meet it; the degree of risk we are willing to run; and the effect of the defense effort of the domestic society and economy that are the source of the wealth that makes it possible.

There are two ways to measure the appropriate size of defense expenditures. Both, we hasten to acknowledge, involve judgment calls and uncertainty. What we offer you today is the collective judgment of several of us, based on our own experience and continuing activity in the national security field.

The first way to measure whether the defense appropriation is adequate or excessive is to look at the military threat we face, and the effort needed to counterbalance it.

The Soviet threat to the United States and our allies is of two dimensions: In an extreme situation where its deepest objectives were at stake, the Soviet Union might consider war a viable option. And in more likely circumstances, the Soviet Union might use intimidation, including the threat of war, to achieve its ends, and even directly or through proxies use military force -- as in Afghanistan, where it concluded that it would not be opposed by the United States or our allies.

There can be no doubt that Soviet military power has grown by every measure during the past 20 years, and that it continues to do so. Whether one looks at the number and quality of Soviet army divisions; or the Soviets' new and growing high-seas navy; or mobility forces, or aircraft, or artillery tubes, to say nothing of the relentlessly increasing size and quality of

Soviet strategic and theatre nuclear forces -- one finds that at every level, the Soviet Union continues to add to its military strength.

We see little point in trying to measure the Soviet military effort in U.S. dollars. The Soviets do not have an economy for which money measures are meaningful. Imputed dollar figures address input. But output is what matters -- the kind and size of forces the Soviets are acquiring, not how to translate the sums they spend. The important conclusion on which all serious analysts agree is that Soviet defense efforts are not slackening, but rather are increasing. The only dispute is as to the rate of growth. Historically, in spite fo their unsuccessful economy, the Soviets have been able to channel whatever resources they deem appropriate to the military.

The unpleasant but real consequence is that the United States even more than in the past faces a military threat of considerable magnitude, one that counsels a substantial effort on our part. But we should by no means feel that our task in that regard is hopeless. We have succeeded, and we can continue to succeed, very well. Deterrence has protected this country and our allies from major war for forty years, and with adequate effort there is no reason to doubt that it will continue to do so.

A second way to consider how much we should spend on defense is to look at the U.S. economy. We of course cannot afford perfect military security without bankrupting the country, and so we have never tried. But we can afford a substantial defense, one of significant real growth, close to if not at approximately the levels proposed. Even with the increase proposed in the current budget submission, the amount of U.S. gross national product that would be spent on defense would be less than 7% -- or substantially below the 9% of GNP that this country allocated to defend itself during the administration of

President John F. Kennedy, when this country enjoyed clear nuclear superiority that we no longer have, and when the Soviet threat was many times less.

Because of cuts in taxes and eroding of the Government's revenue base, and skyrocketing interest on the national debt, the federal budget today is in a pinch. But it would be both unrealistic and unwise to imagine that that budgetary shortfall can safely be made up in any substantial part by cutting our country's defenses, or that substantial cuts in defense do not decrease our national security. We believe that defense dollars can be spent much more wisely than they are now, more wisely than the Administration proposes. But the amount proposed for FY 1986 is well within the range of what this country can afford, and is less than the United States has wisely spent in peacetime before. We recognize, however, that there is a substantial possibility that none of the three key variables -- defense spending, domestic spending, or taxes -- will be adjusted unless each of the others is. In the context of an overall readjustment to solve the budgetary problem, we would still suggest that defense spending increase on the order of a real growth of at least 3% to 5%.

How To Spend the Money

The steps we and our allies take to meet the Soviet threat are, of course, reflected by the forces we acquire and the strategies we employ. Different strategies call for different forces. Here, in our view, the current Administration has badly misstepped. The Administration strategy, to the extent one can discern any strategy at all, has overstressed the nuclear and maritime forces, at the expense of the land, air and mobility forces.

The critical regions for the United States are Europe, the Far East, and, more recently, the Persian Gulf. Yet while it is widely recognized that NATO's conventional forces could withstand a Soviet conventional attack for only a matter of a few weeks, the Administration has not improved U.S. capabilities, nor caused our NATO allies to do so, sufficiently to alter that balance -- and this despite much larger defense budgets than in the 1970's. Likewise, for the Persian Gulf -- a new theater -- the Administration has offered talk, but has created no new capabilities. Moreover, in spite of all that this country has spent on military hardware, our ability to move forces quickly to Europe or to the Persian Gulf remains enormously deficient.

What the country has bought instead is an extremely expensive naval buildup -- nice to have, but extremely vulnerable, and more designed for showy peacetime "presence" missions than for serious war fighting. We also have purchased new strategic nuclear forces, some of which make good sense (like the sea-based Trident D-5 missile), but others of which are subjects about which reasonable analysts differ (like the B-1 and MX) or are systems in search of a mission (like the naval nuclear land attack cruise missile).

The Administration's FY 1986 budget has fat in the strategic nuclear and in the navy shipbuilding areas. It ought to do more for our conventional forces, particularly land forces and lift. Conventional forces are not cheap, but in an era of strategic parity they are essential to maintain the balance between ourselves and the Soviets and lessen the threat of nuclear war.

Looking at the proposed defense appropriation for FY 1986, we urge a reallocation of funds from lesser priority programs to more urgent needs. We do not recommend substantial cuts in the total. The safety of the country should not be asked to fund fiscal mismanagement. If the Congress decides to cut from the Administration's defense request, however, these same lesser priority programs that lie at the margin are the most sensible targets. To reduce them, it must be recognized, will also reduce U.S. military capability; but the harm will be less, in our view, than cutting other defense elements.

What we urge that you not do -- and what unfortunately happens too often -- is to cut funds arbitrarily from operations, maintenance, spare parts, ammunition, and other mundane accounts that have no political constituencies, but that are what really determine whether our forces are ready to fight when called upon -and thus are able to deter war.

Here, then, are some large-dollar deletions, as well as some additions, for the Committee to consider:

In the strategic nuclear arena, we would first of all slow, but not halt, the Strategic Defense Initiative. The series of research programs that have been packaged under this slogan are highly technical, and extraordinarily difficult. The amount of money the Administration is asking for, $3.7 billion for research and development in FY 1986, is a fantastic increase over this years $1.4 billion, an increase that will be probably impossible to spend well. We favor the continuation of research, which may very well come up with some useful but modest advances. But the amount spent should be modest in proportion, particularly because it is doubtful that any research program can nearly triple in a year, as the Administration proposes, without wasting most of the increase. S.D.I. should be cut by $1 to $2 billion from the Administration's request.

We also would recommend a olose look at the $6.2 billion proposed for production of 48 B-1B bombers. (Some of our group would favor terminating the program completely, others would simply slow it.) A slowdown would unfortunately drive up unit cost, but would help the current budget deficit and would also keep the production line available longer. It would also spare you for a while longer from the pressure that is inevitable coming to but more B-1s after the initial buy of 100 is completed.

The proposed $3.2 billion for 48 MX missiles in FY 1986 also could be slowed, again giving budgetary relief in the current year at the expense of overall program cost increases.

(some members of our group would favor terminating the MX program entirely.)

For naval forces, there can be very large savings if we stay at 13 instead of going to 15 carrier battle groups. The two new aircraft carriers that are coming could replace older ones, saving the expense of all the ships and aircraft that otherwise would have to be purchased to protect these expensive and vulnerable vessels. Carrier battle groups are simply not the top defense priority. Savings are alsoavailable from halting DDG-51 destroyer advance funding ($283 million) and battleship advance funding ($76 million).

In other programs, we would suggest you scrutinize these in particular:

-- The IIR Maverick missile, which is designed to kill tanks, but has severe target acquisition problems.

-- The AMRAAM air-to-air missile ($500 million), because at a likely $1,500,000 per push of the button, it simply costs too much.

-- The Army's DIVAD air defense system, might well be slowed or canceled. Not only is it too expensive, but at least so far apparently it doesn't work ($532 million).

-- The proposed purchase of 48 F-15s. F-16s are not as capable as F-15s, but they are good aircraft and cost less than half the price. Substituting 48 F-16s for the F-15s proposed would save $1.5 billion.

For other savings, we hope that the Congress will do its part and close the unnecessary military bases that now clog the Defense system, and thereby save in a short time at least $2 to $3 billion per year. The time is long overdue.

We strongly urge that some of these decreases be offset by purchase of additional systems which would add to our land, air and mobility capabilities.

On the land, the Army proposes creating two new light divisions. These divisions, however, now lack mobility. We would add to them a vehicle like the light armored vehicle owned by the Marines.

We would also plan to increase the size of the U.S. Army, which now is far smaller than it was in the Kennedy years. The greatest lack in Europe and the Persian Gulf are land force capabilities, and those depend on having sufficient forces in the early days of the war.

We would propose a NATO program in Europe to increase available forces and to enhance the capabilities of those there with the necessary ammunition and other logistical supplies and support. It is essential that our allies join us, but the United States must lead by example, and so we propose to add two additional new divisions over time.

In the air, we would propose a further increase in F-16 capability by increasing the F-16 buy while reducing the F-15 buy, as noted earlier.

In mobility forces, we would add fast sea lift. This country's greatest military problem now is that we cannot get our forces to where they must go quickly enough. We support the Administration's efforts to increase mobility, but we would do more. It is foolish to have forces unless they can get where they need to go with the necessary promptness.

We realize that it is easy to sit on the outside and suggest ways to do the job better. We reoognize that the relative value of particular defense programs is a subject about which reasonable people can differ. But we do not think it is difficult to identify which programs are the marginal ones to question, or to conclude that the FY 1986 budget proposal could buy this country more real defense for approximately the same total expenditure than it is currently arranged to do.

What You Should Ask in Return

The defense of the United States is a need we all share. It is not a special interest group. But as the tribunes of the people, you are entitled to ask those who are in charge of the Defense Department to spend the necessary appropriations efficiently and intelligently.

Unfortunately, it becomes plainer each year that the Pentagon is mismanaged. In fact, lately sometimes it appears to be scarcely managed at all:

-- While drawing attention to indefensible but relatively small improprieties in the defense procurement process, the Administration has ignored the billions that get misallocated when the wrong weapons system gets purchased.

-- While talking about strategy, the Administration has built its defense program mainly by asking the four Service bureaucracies what they would like to buy, in order to fight the four different wars that each respectively contemplates. Instead of integrating and questioning those proposals, too often the Administration simply staples them together and sends them to you.

-- While talking about decentralization, the Secretary of Defense has added to the tangled Pentagon bureaucracy There are now so many assistant secretaries of defense -- 11 at last count, compared to 6 in 1981 -- that the topheavy central bureaucracy is expanding too fast for the printers of organization charts to keep up with.

-- And in spite of the nearly universal criticism of the antiquated and wasteful Joint Chiefs of Staff system -- criticism from former members of the JCS, from six former Secretaries of Defense, and from other high officials as well going all the way back to Dwight D. Eisenhower -- this Administration shrugs and pretends that the absence of an effective central military staff is just no problem.

The Congress, therefore, is going to have to play a key management role. It is up to you, perhaps through a few tough conditions tied to the appropriations process, to force a more coherent and sensible defense strategy, and a defense organization suitable for the last quarter of the twentieth century. One good start would be to cut the Pentagon's excessive staffs, by for instance flatly denying funds for one-quarter of the persons above clerical level who are now assigned to the civilian secretariats of the three military departments, and mandating a substantial cut in the Office of the Secretary of Defense as well. Another reasonable requirement would be to push reform of military retirement pay in a way that will keep commitments to our military personnel, but reduce future automatic increases. Another would be to direct funding only of the closedown costs of specified unneeded military bases.

The objective is a sufficient defense at the lowest possible cost. The cost inevitably is going to be high. But we believe that you are entitled to insist upon better stewardship of the taxpayers' dollars than you have seen up to now.

Thank you.

REVIEW OF RECOMMENDATIONS

Senator STEVENS. Good suggestions.

Senator Proxmire.

Senator PROXMIRE. I agree they are very good suggestions. I like to see your emphasis on procurement and you indicate we need two more divisions for NATO.

The Joint Chiefs of Staff recommendation I think makes sense.

On the Pentagon staff cut, your retirement pay, your focus is right. I think we should not break our contract. That is our present position.

On the other hand, in the future we should change it.

Thank you very much. I am glad you have come in as Democrats for Defense.

Senator STEVENS. You propose two new light divisions or two new heavy divisions?

Mr. KRAMER. I think that is a matter that deserves some substantial study. There are obvious tradeoffs.

My personal preference, consistent with the mobility to go with it, would be two additional heavy divisions because I think they would be most useful. You run into obvious cost questions. It is not a bottomless well from where we are getting the money.

It might be better to have two light than nothing at all.

Senator STEVENS. Six thousand troops versus twelve thousand troops?

Mr. KRAMER. That is right.

Senator STEVENS. Senator Rudman.

PERSONNEL

Senator RUDMAN. I wondered, Mr. Kramer, whether or not in the work that your group has done you have had a chance, since you refer to management, to look not merely at the Pentagon, but at the service-wide so-called tooth-to-tail ratio?

To reiterate the figures for you, these are approximately 2.1 million military, approximately 1.1 million civilians for a total of a little over 3 million people with a top of 700,000 in combat in direct support and combat direct support. That includes all of the mobility forces, all of the tactical forces and all the strategic forces, leaving approximately 2.4 or 5 million people who are truly an auxiliary in direct support.

Have you looked at that?

Mr. KESTER. Perhaps I could respond to this.

We have looked at it in a general way. I think we have a view on that which probably is not too different from your own.

How one works the numbers is a little difficult. If you go back 20 years, more than 20 years to the Kennedy administration, you will find that the numbers were even bigger and how you count the civilians over in that is another question.

Basically we think there is a problem with tooth-to-tail ratio. It gets worse as the active force shrinks down. There is a certain constant overhead you have there.

We think a lot could be done to cut staffs at all levels. Basically we would start by cutting the staffs in the Pentagon because there is at least one management theory that for every person you have at the top headquarters staff, you have a pyramid of people down who are answering memos and requirements that are laid on by that person at the top.

We think a lot could be done there.

Another thing which I am sure you have also thought about, Senator, is the phenomenon of grade creep within the people who are there. I think the grade structure over the years has gotten very top heavy.

Senator RUDMAN. That is very interesting.

I also want to tell you how pleased I am to see you here this morning testifying. I would make a request of you. I would request you take a look at the proposal I have pending before this committee and the Armed Services Committee and to the extent you might agree with portions of it, I would like to see you, representing Democrats for Defense, talk to some of the people on the other side of the aisle and get their support for this proposal.

It seems to me if we are going to reduce defense expenditures and not reduce readiness and not reduce national security, and I have yet to see another proposal that addresses them that frankly as I have made before the Senate, I certainly hope we can get organizations like yours to support it because it has a great deal of support not only in Congress but in the Pentagon.

Mr. **Kester**. We will definitely look at it very closely and give you our comments and support.

Senator **Rudman**. I would appreciate that very much.

Senator **Stevens**. Senator McClure.

Senator **McClure**. Thank you, Mr. Chairman.

ROUTINE PROCUREMENT

Just briefly, because I think it is one of the most difficult problems, how do you deal with the question of routine procurement?

Everyone looks at the problems in it. I have talked to people within the Pentagon who have done exceptional jobs in many respects. They look at that one and they shake their heads. They say under all the rules and regulations adopted in the last 20 or 30 years, to make sure we don't make any mistakes, we can't do anything right.

Do you share that criticism?

Mr. **Kester**. I do share that view to some extent. I think every time something goes wrong in a major procurement, the tendency is for them to write more regulations to say we are not going to let that happen again.

You know what a government contract looks like. It is inches thick and the system has really gotten quite bogged down.

One interesting statistic that I have heard—I have not personally verified it—is that some of the procurements that go on in classified areas where they operate under a different system, basically less restrictive than ordinary procurement, tend to have much less cost overruns.

Obviously, you can't just tell the Pentagon to buy this stuff anyway you want. There have to be rules and they have to be carefully observed.

How to come out with the right balance is difficult.

There was a group recently sponsored by the Georgetown Center for Strategic and International Studies which has come up with some proposals for reform of the procurement system in defense. Given the experience of that group, I would take seriously their recommendations.

Senator **McClure**. You have not had a chance to make an independent analysis of it?

Mr. **Kester**. No, sir, I have not. Perhaps Frank might have a comment.

Mr. **Kramer**. I think one of the greatest problems and one of the reasons for the rules, of course, is because of the continuous turnover in any program.

The man there for year one does not stay for year four. With the lack of accountability, personal accountability, you have to create systemic accountability. The way that is done is you add on all these rules and that tends to lead to a stultified system. It is a difficult problem.

Mr. **Kester**. I think to the extent you can have a program manager in place for long enough to be in on the take-off and in on the landing as well and hold him responsible, that does have a good effect.

Senator **McClure**. How do you think we could do that?

That is easy to say, but how could we do it under the force structure that we have?

Mr. Kester. I think it can be done if I lean on the Secretary of Defense and the Secretaries of the Military Departments and say we don't want you to take a multibillion dollar program and bring in a Navy captain or Army colonel or major general or rear admiral and put him in there for 1 year and then move him on to his next assignment and bring in somebody else.

We want you to have people who do have some experience and training in this area.

Senator McClure. It is not a $1 billion weapon system that causes the greatest difficulty. It is routine procurement.

NAVY SPECIALTY IN BUSINESS

Mr. Kramer. They are really both. The point that John makes is fine. I thought John Lehman for once had a good idea with the notion of creating a specialty within the Navy of business.

You hear a lot of arguments these days that the Pentagon military man has become too much of a managerial man and not enough of a warrior. Here he is going in the opposite direction.

The fact is that we need both kinds of persons in the military. It is a big business after all.

Senator McClure Don't we have to clear away a whole host of regulations and requirements and procedures before anybody can manage it well?

The paper trail of simple procurement would fill this room—with paper, that is, not with procurement.

Mr. Kramer. I think if you are going to do that, most of those regulations grew up in response to a perceived problem, abuse of some sort or other or to avoid such a thing.

Senator McClure. We ran into an article in the newspaper that mentioned a $700 toilet seat, so we have a whole host of regulations to make sure it won't happen again. Next time it will be a $1,100 toilet seat because of the regulations we put in.

Mr. Kramer. With respect to the general thrust, I am in favor of it.

Mr. Kester. I would say if you were to mandate substantial cuts in staffs, it might have side effects which would help the procurement process as well.

Some of the high prices for things like coffeemakers and toilet seats and whatever comes through this system of military specifications, they won't go down to Hechinger's and buy it. They will design it from scratch in the staff.

If you don't have that many people in the staff sitting around with time to write these requirements, they might have to do the simple thing and get a toilet seat that was not ultimate per toilet seat, but one that would work.

Senator McClure. I suspect what we would end up doing is that we would not buy the aircraft in which the toilet seats would be installed. We would simply slow down the paperwork and lack of toilet seats would keep us from having an aircraft.

Mr. Kester. I would hope that would not be the result.

Senator **McClure**. I only say it semifacetiously, Mr. Chairman, because I have talked to a number of people in the Pentagon who focused on that one. They throw up their hands and they say like you do, yes, there is a problem, we simply don't know how to keep up with it.

Under the rules and regulations that we have we are required to make a statutory change to some degree, but more than that is the massive amount of regulations and rulemaking. Get rid of a lot of the paper trail.

Mr. **Kester**. I could not agree with you more on that.

My only caution is obviously you can't get rid of all of it, but it has gotten out of hand.

Senator **McClure**. One of the things that gives us the horror stories and I think perhaps the most important single factor facing us in terms of public acceptance of the military budget today is not understanding the Soviet threat, but understanding the Pentagon.

CONTRACT OVERHEAD

One of the requirements is to assign overhead on a contract. The contractor does not give a darn where the overhead is assigned. So, you load a lot of it on a spare part that does not amount to anything anyhow.

The Pentagon requires you to put it anywhere. The contractor does not care. It does not matter to the taxpayer very much if it is a competitive bid. If he has the lowest contract, it does not matter how the overhead is assigned.

How much overhead is there on a procurement of a bolt? Yet we require that as a matter of regulation. That is silly.

Why can't we get some people like yourself looking at that problem and making some recommendations that will aid us in changing the law and aid the Pentagon to change some of the regulations?

Senator **Stevens**. You are correct. We have had a hearing on that in connection with the ladder and other excess cost items.

The Inspector General pointed out in the basic competitive contract that amount would have been in the contract somewhere. They assigned it on a unit basis on an individual item. They did not pay more for the ladder. They assigned that overhead to the cost of the ladder.

Many times these things are misleading. The public thinks we are paying extra for the ladder.

Mr. **Kester**. The Pentagon is the worst enemy in explaining the way things happen. Some of these horror stories are simply bookkeeping matters.

Senator **Stevens**. Senator Sasser.

Senator **Sasser**. Gentleman, I missed the earlier questions you may have gotten into.

REPLACING F-15'S WITH F-16'S

Would you amplify on your suggestion that we substitute F-16's for F-15's?

Mr. **Kramer**. Yes, sir, the F-16 is an enormously capable airplane. As a general proposition we favor as many of them as we possibly can.

What we are talking about is opportunity cost rather than what might be perfectly desirable in a world where we didn't have any constraints. In that context the F-16 is a very good airplane.

We have quite a lot of F-15's. One of their main advantages is beyond visual range capability. We have enough. But we have a fair amount that can deal with that issue.

When you buy an F-16, you are paying about half the amount. What we think you can do is get quite a lot of capability either at lesser cost, total cost, or at even costing, we think you will get more capability in the end.

Senator **Sasser**. You think we would be better buying a smaller quantity of F-15's than a smaller quantity of F-16's?

Mr. **Kramer**. Or substituting one for one realizing you don't get the same military capability.

Senator **Sasser**. Substituting a little more quantity for perhaps less quality? Is that a fair estimate?

Mr. **Kramer**. Yes, sir.

ADDITIONAL ARMY DIVISIONS

Senator **Sasser**. Now, talking in terms of two new light divisions or two additional Army divisions, could we wring those two new Army divisions out of the present 760,000-man strength in the U.S. Army?

The Secretary of the Army and others in the Pentagon have told me that they raised these two light divisions in two ways.

One out of the present strength of the Army.

And, second, I think they lowered the number of men in the division.

Senator **Stevens**. One brigade in each one of the research of components.

Senator **Sasser**. In your judgment, could we wring two more divisions out of the present Army manpower?

I say that for this reason. I had a three-star general tell me this morning—he is a communications specialist—there are more communications personnel in Western Europe than there are actual infantrymen.

Mr. **Kramer**. I think the answer to your question in one sense is yes, but then you have to ask yourself what you take out of the force in order to do that. The people are there.

Senator **Sasser**. You are talking about two new divisions, 24,000 men?

Mr. **Kramer**. We deliberately left it open. It depends on how light or how big they are. Of course, the slots are there, but if you did not add any more forces to the Active Army, then you would have to take away something else.

This gets to some extent to what Senator Rudman was talking about. We as a group are unhappy with the tooth-to-tail ratio as a general proposition.

At the same time I think as a group we are concerned about the ability to get out forces to where they need to go quickly. It seems to us that is the critical component of having an effective force.

One of the concerns I think we would have is that in mobilizing, you have to have a certain amount of forces, in our experience, in the Active Army in order to have the mobilization go well.

So, I think you have to be very, very selective. You are going to have to use a very careful scalpel. I wouldn't want to overplay and I think the Army would fight tooth and nail as to how easy it would be just to create two new divisions, given the current ceiling.

In one sense they are able to do it. But I think it is something that needs real serious and careful study. I try not to say that as a copout. I think it is possible to do, but something you have to look at deliberately.

Mr. KESTER. You have to look at it from the standpoint that our Army is the smallest size it has been since way back in the 1950's. I doubt if it could get much smaller. It would not bother me to have the Army get bigger, but that costs money also.

TOOTH-TO-TAIL CAPABILITY OF ENTIRE MILITARY

Senator SASSER. I am also concerned about the tooth-to-tail capability of the entire military and particularly the U.S. Army. I would like to see a much higher ratio of combat units and combat strength to those who do logistical support and whatnot.

I am sometimes discouraged, I might say, Mr. Chairman, at the amount of funds that we put into the Defense Establishment and the trickle that seems to come out at the other end.

I think that the point that you both made that you should not really measure your effort in terms of dollars is a point well made. I am not sure that we get a dollar's worth of buying out of a dollar put in the Department of Defense as compared to what the Soviet Union gets out of their money.

Mr. Chairman, there are other questions I would like to ask later, but I will yield now to Senator Chiles.

MX MISSILE PURCHASE

Senator STEVENS. I am constrained to note at this point your statement does not refer to the MX.

Senator KRAMER. The statement does refer to the MX, the 48, because we were dealing with the budget.

Senator STEVENS. I did not notice it.

Mr. KRAMER. It says we would certainly reduce the buy to 48. Some of the people in the group would kill it completely. Others would substantially reduce it.

I think at least it would be fair to say the lowest level consistent with maintaining the program and the alternative would be to kill it entirely.

Senator STEVENS. Senator Chiles.

Senator CHILES. I have no questions.

Senator STEVENS. Thank you very much, gentlemen.

Senator KESTER. Thank you, Mr. Chairman.

Senator SASSER. If I could ask one more question. The Chair jogged my memory.

Gentleman, if you had to make a choice between purchasing 42 or 63 MX's and applying the same or passing up the MX's and putting those funds into conventional weapons, which would you recommend we do?

PURCHASE OF CONVENTIONAL WEAPONS

I ask this question because I noted in an article in the Wall Street Journal yesterday written by Congressman Bennett of Florida, chairman of one of the subcommittees over there, in which he had a list, a very impressive list, of conventional hardware that could have been purchased over a period of years if we had put the R&D money into conventional hardware.

One item that struck me was 841 M-1 tanks.

Mr. **Kramer**. Senator, if we could each take this——

Senator **Sasser**. I would be very much interested in getting your answer.

Mr. **Kramer**. This is a very hot issue. You will see the unanimity of our group in a minute.

In my view, the first thing to do, it seems to me, is to recognize that continuation of the MX Program in fact does affect the Soviets. I think it would not be facing reality to think it doesn't.

Having said that, I think we have a strong enough strategic program, enough modernization going forward to cruise missiles, Stealth and the like that, in my personal view, we don't need the MX.

I also think it is enormously vulnerable and adds to the difficulties of strategic stability. So, on balance, what I would do is go, in your terms, for the conventional forces.

I think John will give you a slightly different view on that.

Mr. **Kester**. It is a very tough question, I think.

First of all, I don't know if you took that $3.2 billion in the 1986 budget for the MX out, that it would be possible realistically to assign that to buy conventional forces.

Senator **Sasser**. I would vote to do that.

Mr. **Kester**. You would vote to do that. I don't know that you could get 50 others to go along with you.

I think in the case of the MX, although I would certainly slow down the program, I would not want to terminate it because I think that it does have tremendous impact in our international situation.

I think that it is a significant factor in the arms control opportunity. I think that the perceived will of the United States in the strategic arena accounts for a great deal more than the actual military value of the hardware that we are buying.

I would cut that below $3.2 billion for sure. I would love to put the rest of that in conventional forces, but I would not take the whole thing into it.

I think at this point we ought to keep the MX Program going.

Senator **Sasser**. If I may follow up on that, Mr. Chairman?

Are you talking in terms of actually procuring MX missiles or are you talking in terms of keeping the production line open?

Mr. **Kester**. I am talking about procuring them at a slower rate.

Senator **Sasser**. Procuring and deploying?

Mr. **Kester.** Procuring and deploying at a slower rate.

In the procurement, as I understand it, there are a certain number of shares that go along with it, so the number deployed is not the same as the number procured. There are many different ways to mix that.

I would keep the production going at a certain rate. I am not sure that I could tell you precisely what that would be, but I think there is a range that would be satisfactory.

Senator **Sasser.** I want to commend the chairman for allowing the Democrats for Defense to testify today and say that those two terms are not mutually exclusive.

Senator **Stevens.** I am willing to see anybody for defense.

Thank you very much.

Mr. **Kester.** Thank you, Mr. Chairman.

Senator **Stevens.** I think we ought to serve notice to Mr. Steinberg, Captain Buesener and Dr. Rosenzweig that in all probability we cannot get to your testimony today. There has been a greater participation than expected and we have questioned witnesses longer than normal.

We will set another time. I didn't think it would be fair for you to wait because we have a schedule at noon that we all must make.

Mr. Steinberg, Captain Buesener and Dr. Rosenzweig, we will be in touch with you through the staff to tell you when we will reschedule the balance of the hearing.

Thank you very much.

Institute of Electrical and Electronics Engineers, Inc.

STATEMENT OF ARVID G. LARSON, CHAIRMAN, INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS, INC., DEFENSE RESEARCH & DEVELOPMENT COMMITTEE

ACCOMPANIED BY BILL HAROLD

PROCEDURE ON REMAINDER OF HEARING

Senator **Stevens.** We have two more witnesses this morning. The first is Mr. Larson, Institute of Electrical and Electronics Engineers, Inc., and then Mrs. Daley and Reverend Mullins are together.

I am constrained to tell you we must be at a meeting at noon.

Mr. Larson, as you can see, we have had extra participation in our hearing. The best I can do is split the 15 minutes remaining between you. We are going to have to limit you to 7½ minutes.

Mr. **Larson:** Thank you, Mr. Chairman. I will try to meet our deadline.

We of the IEEE are very happy to have this opportunity to testify before your committee today. I appear before you on behalf of the Defense Research and Development Committee of the Institute of the Electrical and Electronics Engineers.

Mr. Bill Harold, my associate is next to me. IEEE is the world's largest technical professional society with over 215,000 members in the United States alone.

In my testimony today, which I have submitted for the record, I would like to focus on three concerns of the IEEE which this subcommittee can address through its action on the fiscal 1986 defense budget for research, development, tests and evaluation.

TECHNOLOGY BASE PROGRAM

First, the need to ensure a strong technology base program within the Department of Defense.

TECHNOLOGY TRANSFER

Second, the need for more active mechanisms for technology transfer between our Federal laboratories, universities, and industry.

UNIVERSITY RESEARCH

Third, the need for a more positive Defense Department role in improving the quality of our Nation's university research.

SPECIFIC ISSUES

The purpose of my testimony today is to encourage your subcommittee to act on four specific issues. These are.

No. 1, to appropriate the full amount authorized for the defense technology base. That is programs 6.1 and 6.2.

Second, to protect the long overdue real growth of the technology base from being dissipated by new starts and related RDT&E activities.

Third, to recognize the importance of the university research initiative to promote technology transfer between the universities and the defense laboratories.

And, fourth, to provide a positive incentive for DOD to embark on a program of university research support.

TECHNOLOGY BASE FUNDING LEVELS

I now wish to amplify our concerns over possible erosion of the DOD technology base funding levels.

The two other topics I touched on are further discussed in my written testimony.

Mr. Chairman, defense science and technology programs, that is, those in the categories of programs 6.1, 6.2, and 6.3A are projected to increase from $6 billion to $9 billion in fiscal year 1986. That is a 47-percent increase in constant dollars.

However, it should be noted that approximately 90 percent of this increase is directed toward advanced technology development budget category 6.3A which is projected to increase from $2.8 billion to about $5.5.

The technology base elements, that is, categories 6.1 and 6.2 inclusive, continue to receive a decreasing portion of the science and technology program funding.

The members of the IEEE have been concerned for some time that this trend concerning the relating allocation of the defense technology base program has decreased with respect to the support of research.

For example, the total defense science and technology program funding has doubled from fiscal 1984 to the projected 1986 levels.

During this period the technology base programs have increased only 15.5 percent while advanced technology portions have increased over 300 percent.

In 1981 technology base funding constituted nearly 15 percent of all RDT&E appropriations. It is now budgeted to constitute less than 9 percent of the total for fiscal year 1986.

Mr. Chairman, in an attempt to begin reversing this trend, DOD has issued a memorandum calling for an 8-percent real growth rate increase for both defense research and exploratory development programs for this fiscal year.

The administration's current request represents this long overdue real growth increase.

UNIVERSITY PROGRAMS

An additional $55 million has also been requested to fund two important but separate activities, the university research instrumentation program and the new university research initiative.

Unless the full science and technology funding request is appropriated and the technology base request is protected, it is likely that these two independent activities will diminish the funding directed toward the technology base programs.

We, therefore, urge this subcommittee to appropriate the full amount requested for the technology base program, including those earmarked for the university research instrumentation program and the new university research initiative.

Mr. Chairman, in the interest of time, I will stop my testimony there and be open to questions.

[The statement of Mr. Larson follows:]

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April 12, 1985

Senator Ted Stevens
Chairman, Subcommittee on Defense
Senate Committee on Appropriations
Room SD 122
Dirksen Senate Office Building
Washington, DC 20510

Dear Senator Stevens:

During the course of my testimony before your Subcommittee on March 19, 1985, you asked that we submit for the record our perspective on the technology transfer ramifications of the new Defense University Research Initiative, given the high percentage of foreign nationals undertaking U.S. graduate engineering programs. As with many such issues, one must weigh the relative benefits to be achieved through the program against its potential costs. In this instance, the intended benefit is to provide better linkages in specific technological areas between the Defense Department and the American institutions of higher learning on which the U.S. defense establishment depends for skilled technical manpower. In this regard, there is a large percentage of U.S. nationals in engineering graduate schools who will benefit from the University Research Initiative and who, because of such partial defense research support, will be better-equipped to serve our national defense technology needs.

On the cost side, there may indeed be a relatively high percentage of foreign national students at U.S. Academic Institutions who could potentially benefit from the same knowledge base. However, due to the fundamentally basic nature of the research to be conducted under the program, it is not apparent that this knowledge could be applied in ways which might compromise U.S. technological leadership and economic competitiveness. It is not at all clear that there exists any significant threat to the U.S. defense technological advantage due to this situation, and on the whole, such foreign student presence is seen to be a substantial asset to the U.S. academic establishment. Further, foreign students in U.S. graduate schools overwhelmingly come from lesser developed countries; countries which generally lack the economic and technological infrastructures necessary to be competitive with the United States.

What is not known is the percentage of these foreign students who will ultimately remain in the United States, nor the interest or capacity of a given foreign nationality to effectively utilize the knowledge of those students who do return to their homelands. Indeed, there is much speculation that many of the best students tend to remain in the U.S. following graduation, ultimately become citizens, and may even become employed within the U.S. defense establishment.

In the final analysis, the IEEE believes that the known benefit to be accrued through the University Research Initiative outweighs the potential cost of educating foreign students in the technological areas under consideration in the University Research Initiative.

Sincerely,

Arvid G. Larson

Arvid G. Larson, Ph.D.
Chairman, IEEE Defense R&D Committee

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IEEE TECHNICAL ACTIVITIES BOARD/UNITED STATES ACTIVITIES BOARD
RESEARCH AND DEVELOPMENT COMMITTEE

PREPARED STATEMENT

By
Dr. Arvid G. Larson, Chairman
IEEE Defense Research & Development Committee

Mr. Chairman:

My name is Dr. Arvid G. Larson, and I appear before you today on behalf of the Defense Research & Development Committee of the Institute of Electrical and Electronics Engineers, Inc. (IEEE). The IEEE is the world's largest technical professional society, with over 215,000 members in the United States alone. It's Defense Research & Development Committee was formed to develop and voice the Institute's views on the research and development programs and policies of the Department of Defense.

In our testimony today I would like to focus on three concerns of the IEEE which this Subcommittee can address through its actions on the FY 1986 Defense budget for Research, Development, Test & Evaluation (RDT&E): the need to ensure a strong Technology Base program within the Department of Defense; the need for more active mechanisms for technology transfer between our Federal laboratories, universities and industry; and the need for a more positive Defense Department role in improving the quality of our nation's university research.

Specifically, we urge you to:

- o Appropriate the full amount authorized for Defense Technology Base;
- o Protect the long overdue real growth of the Technology Base from being dissipated by new starts;
- o Recognize the importance of the University Research Initiative to promote technology transfer between the universities and the Defense Laboratories;
- o Provide a positive incentive for OUSDR&E to embark on programs of university research support.

Science and Technology Programs in the Defense Department's FY 1986 Budget

The Defense Science and Technology programs (Research 6.1, Exploratory Development 6.2, and Advanced Technology Development 6.3A) are projected to increase from $5.9 Billion in FY 1985 to $9.0 Billion, about a 47 percent increase in constant dollars. However, it should be noted that approximately 90 percent of this increase is directed toward Advanced Technology Development (that is, budget category 6.3A), projected to be increased from $2.8 Billion in FY 1985 to $5.5 Billion in FY 1986. The Technology Base elements (that is, budget categories 6.1 and 6.2) continue to receive a decreasing portion of the Science and Technology programs funding. Within Technology Base, the Research category (6.1) funding in FY 1986 would increase about 8.5% above inflation to $971 Million, and the Exploratory Development category (6.2) is requested to be increased about 8.6% above inflation to $2.6 Billion. Of the $971 Million devoted to Defense Research, $106.4 Million would be directed toward electronics research activities.

The IEEE has been concerned for some time that the Defense Technology Base has received a steadily diminishing portion of total Science and Technology funding levels. For example, total Science and Technology funding has doubled from FY 1984 through the projected FY 1986 levels. During this period the Technology Base portion increased only 15.5%, while the Advanced Technology Development portion increased over 300%. Thus, whereas in FY 1981 Technology Base funding constituted almost 15% of all of RDT&E appropriations, it is now budgeted to constitute less than 9.0% of the total for FY 1986.

In an attempt to begin reversing this trend, Secretary Weinberger issued a memorandum on August 9, 1984, calling for an eight percent real growth rate for both Research and for Exploratory Development for Fiscal Year 1986. The Administration's current request represents this long overdue real-growth increase. An additional $55 Million has also been requested to fund two important but separate activities, the University Research Instrumentation Program and the new University Research Initiative. Unless the full Science and Technology funding request is appropriated, and the Technology Base request is protected, it is likely that these two independent activities will diminish the funding directed to the Technology Base Programs. We therefore urge this Subcommittee to appropriate the full amount requested for Defense Technology Base, including that earmarked for both the University Research Instrumentation program and the University Research Initiative.

Improving National Mechanisms for Technology Transfer

For years the IEEE has supported improved mechanisms for meaningful exchange of knowledge between our Federal Laboratories, universities and industry. We supported the Stevenson-Wydler Technology Innovation Act of 1980. Under this legislation, which was signed into law, mechanisms were established in the Department of Commerce and the Federal Laboratories to disseminate the results of research from the Laboratories to the private sector. Unfortunately, the current Administration has never implemented the Law with the level of commitment envisioned by its authors. More recently, the Office of Science and Technology Policy issued the Findings and Recommendations of its Federal Laboratory Review Panel, headed by David Packard, to which IEEE also contributed. Amongst the panel's recommendation's were that "...the degree of interaction of the Federal Laboratories with universities and industry varies among laboratories, but has not been strong traditionally. The national interest demands that this collaboration be stronger to ensure continued advances in scientific knowledge and its translation into useful technology."

In October, 1983 the Defense Department issued guidelines (revised in October, 1984) on the reimbursement of Independent Research and Development that placed a premium on industrial IR&D conducted at universities. In our testimony before the House Appropriations' Subcommittee on Defense last year we endorsed these revisions as adding a positive incentive to joint university-industry cooperative research. We are pleased this year to add our support to another effort with a similar objective, the University Research Initiative. Originally requested to be funded at $25 Million in FY 1986, this program is intended to strengthen University-DOD Laboratory interactions, establish Multidisciplinary Engineering Research Centers on campus, and fund Research Awards in specific high payoff technologies. Funding would be available to support research by university faculty on sabbatical at the DOD Laboratories, and for Research Initiation Grants which would enable them to continue this research after they return to their universities. It is our understanding that the President's Science Advisor, Dr. George Keyworth, in testimony before the House Armed Services Committee, fully endorsed the University Research Initiative and agreed that $150 Million would be a realistic funding level for this effort. We agree with this proposal, and urge you to appropriate $150 million for the University Research Initiative, but only if it can be funded with new monies so that real growth of the Defense Technology Base will not be less than 8% over its FY 1985 funding level.

Defense Department Support of University Research

The DOD Authorization for Fiscal Year 1970 contained a provision, which has since become known as the Mansfield Amendment, which barred DOD from financing "...any research project or study unless such project or study has a direct and apparent relationship to a specific military function or operation." (Section 203, Title II, Public Law 91-121). Despite the fact that this provision was amended in the following year to leave the determination of relevancy to the Secretary of Defense, the impact of the so-called Mansfield Amendment has been to contribute to a general reduction of Defense Basic Research. In 1965 program 6.1 Basic Research was funded at $347 Million. By 1975 this level had dropped to $305 Million, less than 50% of the 1965 level when measured in constant 1972 dollars. Although this declining trend in funding was reversed during the latter half of the 1970's, Defense Department support of basic research through Fiscal Year 1985 hasn't yet reached a level equal to that of 1965 when measured in constant dollars, though overall DOD appropriations have increased significantly. The consequence of this net decrease in Program 6.1 funding has been to reduce DOD support for university research, thus contributing to the deteriorating capacity of the universities to perform quality scientific research, and severing important linkages between graduate curricula and defense technical manpower requirements during a period when our national security has become increasingly dependent upon the technological superiority of its weapons systems over the quantitative advantages our adversaries. We also believe there are many indirect consequences of this policy which account for our declining national ability to compete in many high technology areas, and serve to further reduce our world leadership in high technology.

In recent years there have been a number of efforts by the Office of the Undersecretary of Defense for Research and Engineering (OUSDR&E) to contribute to the University research environment in order to better assure the positive interaction between university researchers and defense technology needs. Since 1981, the Office of Research and Laboratory Management within OUSDR&E has served as a focal point for DOD efforts to strengthen research and engineering programs in areas of importance to our national security. Their efforts have included: (1) the establishment of the DOD-University Forum, intended to improve communications on issues of mutual concern; (2) the revision of guidelines for the reimbursement of IR&D, mentioned earlier, which is also having the positive impact of increasing interactions between industrial and university researchers; and (3) the development and management of the University Research Instrumentation Program, again budgeted for $30 Million in FY 1986, intended to improve the adequacy and utility of University research equipment. Finally, this year's new start, the University Research Initiative, described earlier, will increase the level of support given to universities by providing Research Initiation Awards to faculty members returning from interchange terms at the Defense Laboratories.

We feel that this Subcommitee could contribute to these efforts by including in your Appropriation bill some language of positive support for these efforts. Such language might recognize the need to improve the capacity of Universities to support Defense Department research and engineering manpower requirements, and to counter the continuing effects left by the Mansfield Amendment. Such language could also provide greater visibility for Defense Department support of University research by recognizing an organizational element within OUSDR&E that would be responsible for providing such oversight and support. These steps could be accomplished without any significant cost implications, and would provide added impetus to an essential effort by the department.

This concludes my formal statement, and I would be happy to attempt to answer any additional questions you might have.

BIOGRAPHY

Dr. Arvid Larson

Dr. Arvid Larson is a profesesional Electrical Engineer with over 20 years experience in Government contract research and development activities, principally performed for Department of Defense organizations. He is currently Vice President of Analytic Disciplines Inc. of Vienna, Virginia, a subsidiary of ERC International, a diversified professional services company providing advanced systems engineering and technical services support to Government agencies and to industry.

Dr. Larson received a Ph.D. in Electrical Engineering in 1973 from Stanford University, and specializes in computer system engineering, signal processing, and the development of computer and information systems technology within a variety of Government and other high-technology applications areas. Prior to his current position, he served on the technical staffs of Navy Electronics Laboratory, Stanford Research Institute, and Planning Research Corporation, and was a principal in the establishment of Advanced Research and Applications Corporation, a California-based high-technology small business. He is the author or coauthor of one book and over 50 technical papers and reports, and is a member of Sigma Xi and the Armed Forces Communications and Electronics Association.

In addition to being the IEEE Computer Society delegate to and current Chairman of IEEE's Defense Research and Development Committee, Dr. Larson served two terms as Chairman, Board of Directors, of IEEE's Electronics and Aerospace Systems Conference, and is Vice Chairman of the IEEE Northern Virginia Section. He is a Fellow of the IEEE, and is licensed Professional Engineer in the State of California and the Commonwealth of Virginia.

DOD EXPENDITURES ON UNIVERSITY RESEARCH

Senator **Stevens**. I am interested in your comments and I have read ahead in your statement and particularly your reference to the amendment of 1970.

Do you feel that that amendment is still a barring of the utilization of your university based research; is that right?

Mr. **Larson**. Yes, sir, it has that effect. It has been tempered somewhat by the Department of Defense, but the net effect has been the declining trend in DOD expenditures.

Jumping ahead in my testimony, the levels in 1965 were $345 million, in 1975 it dropped to $305 million in real dollars, less than 50 percent of the 1965 level in constant dollars.

The declining trend ws reversed during the 1970's. However, the current fiscal year request has not reached a level equal to that in 1965, measured in current dollars.

The consequences of this net decrease has been to reduce DOD support for university research, which I think is somewhat due to the Mansfield amendment, but there is a more important issue here beside your staff, sir.

The overall support that has diminished in these years has served to sever more linkages between the university community and the defense technology community and especially in the areas of defense scientific manpower.

We also believe that there are many indirect consequences of this policy which account for our declining national ability to complete in many high technology areas and also to further reduce our world leadership in high technology.

Senator **Stevens**. We will have to look into that.

Senator Sasser, do you have any questions?

Senator **Sasser**. No questions, Mr. Chairman.

TECHNOLOGY TRANSFER

Senator **Stevens**. Thank you very much. You have raised in my mind the whole question of technology transfer to foreign students at universities.

Have you looked at that?

Mr. **Larson**. We have not looked into that issue.

Senator **Stevens**. I am told more than half of the people who are studying to receive graduate degrees in this country are foreign students and that one of the problems is the question of technology transfer through the university system if we utilize the university system to a greater degree for defense research.

Mr. **Larson**. I have read information that suggests the population of foreign students in major university graduate programs is high and in some universities it is above 50 percent. It is a consideration.

However, there are American students also that have to be members of the program.

Senator **Stevens**. I am not sure it is good use of Federal funds for students who are foreign citizens.

I would appreciate it if you would look into that and give us your advice, if we did follow your suggestion to increase the base for university research, what would be the impact on technology transfer to foreign governments.

Mr. LARSON. Mr. Chairman, we will do that.

Senator STEVENS. They are sent here by their governments.

Thank you very much. We appreciate your courtesy also in permitting us to catch up.

STATEMENT OF MRS. HELEN DALEY

MILITARY HEALTH PROGRAMS

Senator STEVENS. We now have Mrs. Helen Daley and Rev. Earl Mullins.

Senator Chiles told me you visited with him. We are happy to have you here this morning.

Mrs. DALEY. My name is Helen Daley, wife of an officer in the military.

We have had a very tragic situation. My husband is away on business and is unable to be with me today. I will tell you about our tragedy and hope you will have time to ask any questions you might.

We were refused major medical health by all major carriers at the time we left Florida, at which time I terminated my employment. We preferred to have our own health coverage because of the emergencies we had experienced in military medicine. All coverage was refused because no major carrier wanted to contend with the military as a second or alternate carrier.

After years of infertility, we were pleased with a pregnancy, absolutely the most happy and exciting time of our lives. Until I was 5 months pregnant everything happened to go fine.

However, at 5 months the doctor suspected twins and, therefore, scheduled me for a sonagram the following week. During that sonagram it was learned we did not have twins, but we had one child with numerous abnormalities, including a tumor that was, in simple terms, so large, both interior and exterior, in the child's body that it caused his lungs to be blocked from developing, blocked his bladder which caused stomach cavities to fill with fluid, among other situations.

After seeing approximately 15 military doctors, we were sent to Georgetown University for a second opinion from the maternal fetal specialist there.

After minutes into the test he turned to us and said I am sorry, there is no hope for the child. What you need to do here in this case is terminate the pregnancy, and this is not an abortion clinic, but our purpose is to facilitate what "God has destined to happen."

We returned to our military doctor who talked with these other doctors. They all concurred that we had no alternative but to terminate the pregnancy. At the very least it would result in a Cessarian for me and probably more serious complications. There was absolutely no chance that our child would survive under any circumstances.

We then began at 8 that morning sitting with the doctor while he attempted to obtain for us hospital care on the outside because we were not permitted care in a military hospital because of the

Appropriations Act which stated no Federal doctors would be used for terminating a pregnancy.

Until 2 o'clock that afternoon we sat waiting and calling for assistance. Finally, we were put into George Washington University. We were told we had to have $5,000 up front in order to get in because we had no medical insurance.

Those doctors would get all the tests confirming what we found and terminating pregnancy.

After 12 hours of labor a stillborn child was delivered and following his birth it was determined that the tumor was to such an extent that for me to have carried it any longer would have endangered my life.

Following our circumstances, another military couple faced a similar situation. They had a child which had no head developed, no brain. They also were denied care and had to put out of their pocket for care.

The cruelty of this situation is impossible for me to describe, the heartache of losing a wanted child is intolerable at best. Then to be refused military care. Although the diagnosis by military doctors is such that they want you to terminate, they have no alternative and they say, "We can't do it, our hands are tied."

The problem of many families who are forced to carry a child to full term psychologically is something I cannot begin to imagine. Our 1 week was absolutely hell.

I am not here addressing abortion as a means of birth control and I have never walked in the shoes of a mother with an unwanted pregnancy, but I have walked in the shoes of a mother with a wanted prenancy for whom care was denied.

I urge you to review this Appropriations Act and not put military families through this extended hell which is what already exists.

[The statement of Mrs. Daley follows:]

PREPARED STATEMENT OF HELEN DALY

This narrative is not intended to be either a pro-abortion or anti-abortion forum, but rather is presented to inform the reader of the gross inequities now existing in military medicine because of the military's interpretation of the all encompassing wording of the "no abortion" clause of the Appropriations Bill.

This narrative will briefly describe some of the circumstances surrounding our recent pregnancy, and its subsequent heartbreaking termination. To facilitate this narrative, it has been divided into three parts. The first deals with the circumstances leading up to our pregnancy. The second deals with the actual pregnancy and its termination, and the third part deals with post partum events.

Before the Pregnancy

We had attempted to become pregnant for a number of years and prior to our transfer from Florida to Washington we learned that we most likely would never conceive. Our doctor in Florida recommended that we consult with infertility specialists immediately upon our arrival in Washington. Each of us called the respective military clinics and received a recording saying that it would be months before appointments could be made. We finally located a private doctor whom we saw for private consultation. We paid all the costs out of pocket.

Prior to moving to Washington we attempted to obtain for me, the dependent, major medical health insurance from all the major providers, and were refused. The reason was that since my husband was in the military, and I his dependent, they wanted to avoid the hassles of dealing with the government as an alternate provider. I had had such coverage with my job in Florida which I was forced to give up when my husband was transferred.

The Pregnancy

In May, 1984, we were blessed with a pregnancy. It was absolutely the most wonderful and exciting event in our lives. Although I received confirmation of my pregnancy at the first moment detection was possible, no appointment at the military clinic was scheduled until the third month. We heard the heartbeat on the first visit to the clinic. I continued to return for my monthly appointments and saw a different doctor every month. I had asked for a sonogram, but was told that in military medical care, they are used as a diagnostic tool only if a problem is suspected. As I felt wonderful, and to my knowledge, had no problems, there was no justification for the military to perform a sonogram.

However, at five months into the pregnancy, the doctor who examined me became alarmed as he thought he heard multiple heartbeats and suspected twins. We now qualified for a sonogram, and one was scheduled. However, they could not schedule me for one week. On the day of the test (tuesday), it was discovered that the problem was not twins, but that a massive number of abnormalities had beset our child. A number of doctors were called into the room to view the screen and partake in the diagnosis. Finally, the head of the maternal fetal medicine department informed me that there were problems, but that the ones that appeared usually do not appear simultaneously. He wanted a second opinion and so scheduled us to see the maternal fetal medicine specialists at Georgetown University. My husband was out of town on business, and I called him to return Home.

On Thursday morning we went to Georgetown University Medical Center where the same tests were again performed. After mere seconds into the sonogram the doctors confirmed the diagnosis recieved from the military doctors, and told us that we had no alternative but to terminate the pregnancy. One of the doctors told us that he was Catholic and that he viewed a situation such as ours "not as an abortion, but rather using modern medicine to help the mother through a situation that God has already destined to happen."

Because our case was so unique the doctors wanted to videotape the entire test to be used for instructional purposes. We allowed them to do this in hopes that someone in the future would not have to give up a much desired pregnancy. Not realizing that we would have to pay part of the costs of the second opinion we were surprised when the doctors said that there would be no charge as we had helped them more than they could ever help us. After leaving the hospital we returned home and called our military doctor to inform him that we had seen the doctors at Georgetown. He said that he would talk with the doctors at Georgetown and for us to meet him in his office the following morning, Friday, at 8 am.

At this point I think that it would be beneficial to briefly describe some of the medical problems of our baby. He had a massive tumor that was growing internally and externally faster than he was. It caused his lungs not to develop fully. It also caused blockage to his bladder which, in turn, caused the stomach cavity to fill with waste fluid. Additionally, his thorax had not developed. During this period I had been seen by at least fifteen doctors, all of whom concluded that the baby would never survive and that no medical treatment would ever be rendered to him if he should survive the pregnancy and birth which was very doubtful. Although I was 24 weeks pregnant, my size at the time was that of a 32 week pregnant mother.

At 8 A.M. on Friday morning we arrived at our military doctor's office. He then went over the diagnosis from the military staff and from the staff at Georgetown. He stated that the baby would absolutely not survive, and that if I carried the pregnancy any further it would result, at the very minimum, in having to deliver by C-section and could cause more serious difficulties. All the doctors agreed that the only solution was to terminate the pregnancy, and soon.

The Appropriations Act dictated that we would not be allowed to terminate at a military hospital, or use CHAMPUS funds for treatment at a non military hospital. We were devastated. Our doctor then began calling hospitals in Maryland, Virginia and the District of Columbia that he knew would terminate a pregnancy. We ran into additional difficulties in that many of them have a cut off point of five and one half months, which is where we were by this time, and other hospitals in the area were full, and could not take us until we were well past this time frame. Finally, through a doctor at another military facility, our doctor made contact with the maternal fetal medicine specialist at George Washington University Hospital who instructed us to come to his office on Monday morning. He stated that he would redo all the tests, and if all was in order and he concurred with the diagnosis, he would then terminate the pregnancy. This was all resolved at about two o'clock in the afternoon. We had been sitting in the hospital since eight in the morning, and the prospect of carrying a doomed pregnancy full term, knowing the adverse effects it would have on my health, took its toll on us.

As we were leaving, we were so distraught, that the doctor encouraged us to go to the chaplains' office, which we did. When the chaplain entered we were both sobbing uncontrollably and could not tell him the reason for our distress. When we were able to tell him, he was at a loss as to how to handle the situation. Later, we learned that he had never before been a hospital chaplain. He has, since that first meeting, been one of our greatest supporters, and has used our experiences in helping others. We have frequent contact with him, and value the aid he has given to us.

Because we were not covered by insurance we were instructed by George Washington Hospital that we would need five thousand dollars at the time of admission in order to receive treatment. Friday afternoon was spent pooling resources in order to meet the above requirement. We were lucky. Many military families do not have the resources that we did. Our doctor told us of cases like ours, where the family could not afford the private care and therefore were forced to continue a doomed pregnancy until labor began.

The doctors at George Washington concurred with all the previous diagnosis and on Monday afternoon, I was checked into the hospital. Labor was induced, and after twelve hours in labor, on Tuesday morning, I gave birth to a stillborn baby boy. Until the last minute the possibility existed that we would have to deliver C-section, but fortunately, both for financial and health reasons, I was able to deliver vaginally.

Our total medical bill is approximately $2,200. This was low for several reasons. First, I did not use an anesthesiologist.

Second, a C-section was not necessary. Third, we did not use the delivery room. The doctors at G.W. realized our financial situation, and allowed us to deliver in the labor room, thus avoiding operating room costs. And, finally, after delivering at 6:05 A.M., I was discharged at 10:00 A.M. avoiding the expense of another day in the hospital. For others in the situation, these costs cannot be avoided, and consequently their bill is much greater.

Post partum

After the birth the doctors informed us that all the defects suspected did in fact exist, and more were found. They also stated in writing that for me to continue the pregnancy would have resulted in an endangerment to my life. Our military doctor concurred. However, CHAMPUS, to date, has refused our medical claims on the basis of the Appropriations Act.

We have now been referred to an infertility specialist in a military clinic, but he is available only two days a month. Can you imagine the number of people trying to make appointments for these two days. Finally, a semen analysis was improperly done, rendering false results, and a doctor who was working with me suggested that we use a private doctor for such purposes, for, he said, the military really doesn't have anyone available in that specialty.

Additionally, at the invitation of the Hospital Ethics Board, through the work of the chaplain, we presented this sequence of events to the board to better enable them to understand the plight of members of the services involved in similar situations. At no time were we offered or provided with counseling services.

Conclusion

The loss of our child was an enormous heartbreak for both of us. This pain was compounded by the refusal of military care and because of the financial strain placed upon us. Since the birth of our baby on September 25, 198~~5~~4, we have been contacted by a social worker asking if we could help another family who had received word that their baby was developing with no head, just a brain stem. Since that baby's heart was beating, termination of the pregnancy at a military hospital was not allowed. They too had to seek help in the civilian medicine world, and pay for it out of pocket.

Again, let me assure the reader that we do not advocate government sponsored abortion as a convenient means of birth control. But, in situations like ours, it is cruel and inhumane to refuse the necessary treatment. Words can never express the psychological stress that carrying a child who cannot possibly survive under any circumstances places on a couple. For us, the one week that we knew of the situation, and were unable to get help, was a living hell. We hope for another pregnancy. To carry a child such as ours for a full term not only creates immense stress, but it also prevents recouperation and attempting another pregnancy is delayed. In many military families spouses are frequently separated for many months. I cannot imagine how a female could endure such stress and continue to function while her husband is deployed.

In closing, it is hoped that the events detailed above will cause the drafters of the Appropriations Act to realize how inflexible the "no abortion" clause really is. It is unfair for a doctor to have to give a diagnosis and recommend treatment that he or she cannot provide, and it is devastating for a family to be refused treatment, and have to make alternative arrangements.

March 1, 1985

ABORTION FUNDING

Senator Stevens. I have to go.

I want you to know I understand your problem. Even if you had a concern, it would not have covered the payment anyway under another bill. So, it is a very difficult problem.

Some of us have pointed that out and opposed such riders in the past. They now are rather routine. I am saddened that it is also now codified in the authorization bill.

Even if it is not in the appropriation bill, it is a permanent prohibition against the use of Federal funds to assist in such procedures or to support an insurance that would assist in such procedures. That is one of the sad things that happens.

Senator Chiles. Mr. Chairman, it is one of the things that the testimony is bringing up. In this instance it was life threatening. Yet the military was still afraid to go forward even though they had the opinion from Georgetown, a Catholic university hospital, which certainly does not lean toward abortion.

In this instance, with all of the medical testimony they had, they still would not go forward. It is like they have decided they would rather err on the side of even taking the mother's life before they would do anything in this regard.

Senator Stevens. The law is the law. I voted against that, but that is the provision of the law. I have voted against it each time it has come up. It is a personal problem for a lot of people as a result of what Congress has done.

Senator Chiles. I would hope we would look at it to see if perhaps in report language we could see that they are not erring on the side of endangering life.

Senator Stevens. They are forbidden to use the funds in this military for such procedures in my interpretation and I think it is wrong.

I must go to another meeting. Will you finish the hearing, please?

Senator Chiles [presiding]. I thank you very much for coming forward and giving us your testimony.

I think it is so clear that you very much wanted this pregnancy and this child, there was no effort on your part in any way to do away with the child other than the medical evidence you received that you had to.

I understand the time was very, very short, when you did then have to abort, as to whether you could have aborted at all.

Mrs. Daley. Yes, that is correct.

Senator Chiles. Your life could have been threatened.

STATEMENT OF REV. EARL MULLINS

Reverend Mullins. Obviously, there is very little I can add. I was a hospital chaplain for several years in a women's specialty hospital and have worked with nearly 10,000 or more patients who had all kinds of obstretical and gynecological problems.

It was almost disbelieving when I found out that military funds cannot be used to help women in such a situation.

I realize it is an incredible agenda, you have been here since 10 o'clock this morning. You have an incredible agenda.

I would hope in the midst of this in some way you could find a way to make a specific exception to people in such circumstances. It is clearly wrong. It lacks compassion and I would hope the system could change that.

[The statement of Reverend Mullins follows:]

Prepared Statement of Rev. Earl Mullins

I am an Episcopal priest serving in a parish. Previously, I was a hospital chaplain who worked for seven years in a women's hospital which specialized exclusively in obstetrics and gynecology. In addition, I have had over five years of clinical training as a professional pastoral counselor. Having worked with hundreds of women who wrestle with decisions regarding abortion, I have obviously experienced a broad range of situations and circumstances. I do not support and have never supported laissez-faire abortion.

Most recently, I have been a pastor, counselor, and priest to a military couple who wanted with all their beings to have a child. After great difficulty, they conceived. Their joy was ecstatic until they discovered that the child had numerous lethal anomalies and would soon die. After three different maternal-fetal specialists recommended they terminate the pregnancy, they did so. I truly believe their painful decision was the most loving, moral, compassionate, and ethical one available to them and to their unborn child.

The military would not cover any of the medical expenses they incurred. Understandably, this compounded their grief and loss. I believe the military's present insurance policy toward abortion is too narrow and lacks compassion. I strongly urge the Congress to amend this policy to extend financial help to couples in the situation described above

INTERPRETATION OF ABORTION LAW

Senator Chiles. We thank you both for your testimony. This is a continuing debate which has been going on here for a long time.

A number of us feel that while we didn't support anything like abortion on demand, that we had to in some instances look to see that we treated the military personnel in the way we treat all folks, although we didn't feel you should use taxpayers' dollars for some kind of abortion because one decided not to have the child.

When you get testimony like this, it shows you how far the law now goes. I think that does raise tremendous concerns on the part of a number of us, whether that is the way the law should be and the way it should be interpreted.

I would hope there would be some way that we could at least get a more valid interpretation of the law when the medical testimony is as strong as it was in your particular case.

We thank you both for your testimony.

Mrs. DALEY. Thank you.

SUBCOMMITTEE RECESS

Senator CHILES. The subcommittee will stand in recess until 10 a.m. on March 26 when it will reconvene to receive testimony on the Department of Defense R&D fiscal year 1986 budget.

[Whereupon, at 12:05 p.m., Tuesday, March 19, the subcommittee was recessed to reconvene at 10 a.m., Tuesday, March 26, 1986.]

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DEPARTMENT OF DEFENSE APPROPRIATIONS FOR FISCAL YEAR 1986

WEDNESDAY, MARCH 27, 1985

U.S. SENATE,
SUBCOMMITTEE OF THE COMMITTEE ON APPROPRIATIONS,
Washington, DC.

The subcommittee met at 10:15 a.m., in room SD-192, Dirksen Senate Office Building, Hon. Ted Stevens (chairman) presiding.

Present: Senators Stevens, McClure, Proxmire, Chiles, and Sasser.

NONDEPARTMENTAL WITNESSES

OPENING STATEMENT OF SENATOR STEVENS

Senator STEVENS. We will continue receiving testimony in the fiscal year 1986 defense appropriation from witnesses outside the Department of Defense.

We welcome you all here. I am sorry we had to continue to this date.

We do ask you to summarize your statements if you will in 10 minutes or less. We will put your written testimony in the record and your testimony will be published as part of the subcommittee hearing record this year.

Mr. Miller and Mr. Hubbard, thank you for your courtesy the other day when we all had to leave to go to the meeting that morning.

THE AMERICAN LEGION

STATEMENTS OF:

JOSEPH E. MILLER, ASSISTANT DIRECTOR, NATIONAL LEGISLATIVE COMMISSION, THE AMERICAN LEGION

JAMES HUBBARD, DEPUTY DIRECTOR, NATIONAL SECURITY/FOREIGN RELATIONS COMMISSION, THE AMERICAN LEGION

SUPPORT OF DEFENSE BUDGET

Mr. MILLER. I am Joseph E. Miller, assistant director of the National Legislative Commission of the American Legion.

With me today is Jim Hubbard who is the deputy director of the national security/foreign relations commission who will summarize our statement and afterwards we will be happy to respond to any questions which you or the members of the subcommittee may want to ask.

Mr. HUBBARD. Thank you, Mr. Chairman.

In view of the subject covered at that meeting, we were very glad to defer until today. We are very pleased with the outcome of the vote on the MX.

Thank you, Mr. Chairman. We are pleased to be able once again to present the views of our 2.6 million members on the defense budget.

In general, we find the $313.7 billion in outlays to be basically in line with your analysis of the requirements for the deterrence of aggression and the defense of this Nation should deterrence fail. We really have very limited choices in what we can do to reduce defense spending.

SUPPORT OF O&M FUNDING

We are pleased, Mr. Chairman, that this committee and the Congress have supported the operations and maintenance funding to the point where training, spare parts acquisition, and the buildup of war reserve stocks have all decreased. We were at the danger level 3 years ago. Now, we are approaching acceptable levels of flying time, steaming time, and realistic weapons training.

All of those activities are essential to keep our Armed Forces in fighting trim. This committee and the Congress deserves our thanks for this effort.

CONTROVERSIAL ISSUES

Mr. Chairman, we would like tc discuss three areas of importance to our members. All are controversial; however, in our view, the inclusion of funds in the defense appropriations bill for these systems is absolutely necessary for deterrence, or should deterrence fail, for the protection of our combat soliders, sailors and airmen and population.

STRATEGIC DEFENSE INITIATIVE

The first of these areas is the Strategic Defense Initiative. The administration has requested $3.4 billion for research into some of the more promising areas of technological development.

Several arguments have been advanced against the Strategic Defense Initiative. One of the first is that the Anti-Ballistic Missile Treaty of 1972 prohibits such initiatives. Neither the Soviets nor the United States ever envisioned that this would preclude research, in which both nations have since been engaged.

Acceptance of the treaty by both sides was based on a, perhaps naive, and certainly incorrect, assumption that further talks would result in significant reductions in the numbers of destructive weapons deployed by both sides.

As we now know, arms talks have certainly not led to reductions; therefore, strategic defense, in the absence of significant offensive reductions, becomes imperative.

Critics of the initiative also point out that what the President is requesting amounts to the militarization of space. We believe that space is already militarized. Both superpowers, and several other nations have launched satellites which have military utility. Both superpowers have tested intercontinental ballistic missiles which travel through space to reach their targets.

Others say that the development and deployment of such a system will increase the probability of one side or the other launching a first strike. This argument ignores two basic facts.

The first and most important is that the United States has never started a war. We have been quick to defend freedom and democracy where it is threatened, and we would do so again. But we have never knowingly and willfully started a conflict.

The second basic fact is that even though a defensive system might not be perfect, it would enormously complicate the targeting problems of the other side. If the Soviets should contemplate a first strike, they would, of necessity, order that strike against our strategic retaliatory capability.

Without knowing how many of their warheads would survive attack by a defensive system, they could never be sure that we would not have enough missiles remaining intact after an attack to conduct an enormously destructive retaliatory strike.

Our purpose is to urge your support for a very important initiative which will have the effect of raising the nuclear threshold and making our troubled world a safer place.

EMOTIONAL REACTION TO DEFENSE BUDGET

The second area of concern to the American Legion is one that invariably raises the level of debate over the defense budget to a highly emotional level. We will attempt to avoid such emotions in our presentation today.

The ability of our Armed Forces to successfully prosecute a war sometime in the future may very well depend on acceptance or rejection of the premises we will present.

There is considerable evidence that the Soviet Union is continuing to test, produce and stockpile chemical weapons. They have also continued to train and equip specialized forces for the conduct of chemical warfare.

The United States at the present time is only engaged in protection and the training necessary to defend from a chemical weapons attack.

The Institute for Defense Analysis recently concluded that since the United States had no retaliatory capability, a Soviet commander would probably use chemical weapons as an integral part of his initial assault on Western Europe. He would have no incentive not to use them.

I would add that we now know they have a definite proclivity to shoot first and ask questions later. The Korea airliner incident and the incident with the army major point that out very clearly.

CHEMICAL WARFARE DETERRENCE PLAN

The administration is requesting $1.3 billion to support the Chemical Warfare Deterrence Plan, first presented to Congress in 1982. As you are aware, that plan has three parts:

Continued research and development into defensive measures against chemical weapons;

The destruction of obsolete chemical weapons;

And the production of deterrent binary munitions which are safe to handle.

The largest portion of the funds are to be spent on additional purchases of protective masks, overgarments, detectors, and other material necessary to provide means of survival in a chemical environment for our Armed Forces.

The second portion of the program involves the destruction of stocks of chemical munitions in the U.S. arsenal which are unsafe and obsolete. Of the current stockpile, about 10 percent remains useful as a deterrent. This portion consists of both persistent and nonpersistent nerve agent artillery shells and nonpersistent nerve agent bombs.

An additional 18 percent has some limited use. The remaining 62 percent is of no use whatsoever to the military and should be destroyed.

The American Legion supports the fund request of $132 million to accomplish the destruction of these obsolete agents and their delivery system.

BINARY MUNITIONS

The third portion of the program is the most controversial. It involves the purchase of a deterrent capability in the form of binary munitions in a quantity certain to prevent the Soviets from using their own considerable chemical capability against our troops, while at the same time announcing a no-first-use policy and continuing to negotiate a treaty banning these weapons from the world.

The administration has requested $207 million—or 16 percent of the total requirement for this program—for the production of binary weapons. The American Legion supports this request.

We can think of no better way to ensure progress in arms control of chemical weapons than to provide an adequate deterrent capability, which we do not now have. There is no thought of matching the Soviet production capability bomb for bomb and shell for shell. Only enough munitions will be produced to ensure that the Soviets will think twice about their use.

Likewise, we can think of no better method of production than the binary method. It separates the lethal agents into two harmless components. They will be stored and transported separately and would only be installed in delivery munitions upon the request of the commander concerned and the order of the President.

The thought of using chemical agents in combat is as abhorrent to us as it is to most Americans. But the thought of an American Army reduced to 50 percent effectiveness by being forced to wear protective gear while the bulk of the attacking Soviet forces are not forced to wear it because U.S. troops have no retaliatory capability is even more abhorrent.

It is unconscionable to deny our troops the weapons they need to survive on the battlefield when the purchase of those weapons will help to ensure they will never be used.

In addition, there is a considerable body of evidence that the Soviets will be more amenable to progress at the arms control talks if we show the Soviets that we will not concede the use of chemical weapons to them, but will demonstrate our resolve to use them in retaliation to any Soviet first use.

MODERNIZATION OF STRATEGIC TRIAD

There is one other area which we would like to discuss briefly. The modernization of the U.S. strategic triad is proceeding, thanks in no small part to the actions of this subcommittee. We are pleased that the initial operational capability of the new Peacekeeper will be achieved in late 1986.

The Navy will have eight new *Ohio* class ballistic missile submarines carrying Trident missiles at sea by the end of the calendar year 1985.

In short, we are gratified by the progress made in a major modernization effort. We believe that the proof of the effectiveness of this effort is the Soviet presence at the renewed arms control talks in Geneva.

We, as do most Americans, believe that the best hope for mankind lies in verifiable agreements to control these terrible weapons. We also believe, however, that absent such agreements, the United States must maintain a credible deterrent in the form of modern strategic and conventional forces capable of prosecuting war in any part of the world where the interests of the United States or its allies are threatened. We trust that progress in modernization will continue.

Mr. Chairman, we have provided to the committee the key resolutions relevant to the security of the United States passed by our national convention in Salt Lake City. We respectfully request they be made part of the record.

Thank you, Mr. Chairman. We will be happy to respond to any questions.

[The joint statement of Mr. Miller and Mr. Hubbard follows:]

The American Legion

JOINT PREPARED STATEMENT

JOSEPH E. MILLER, ASSISTANT DIRECTOR
NATIONAL LEGISLATIVE COMMISSION

and

JAMES HUBBARD, DEPUTY DIRECTOR
NATIONAL SECURITY / FOREIGN RELATIONS

Thank you Mr. Chairman. We are pleased to be able once again to present the views of our 2.6 million members on the Defense budget. In general, we find the $313.7 billion in outlays to be basically in line with our analysis of the requirements for the deterrence of aggression and the defense of this nation should deterrence fail. The United States is the leader of the free world, whether we like it or not. We, therefore, really have very limited choices in what we can do to reduce defense spending. The only realistic method by which the defense budget can be reduced is to limit the tasks assigned to the armed forces. We in The American Legion see no realistic way to accomplish this without either completely alienating an important ally, or conceding an important area of the free world to the Soviet bloc. These alternatives are not acceptable to us as veterans nor do we believe them to be acceptable to the majority of the American people. Not protecting our interests would ultimately result in the world-wide erosion of freedom and democracy and the consequent control of most of the world's natural resources by totalitarian governments who seek to insure their own survival by military means. We believe this would cause a drastic change in American life which most citizens of this nation would find unacceptable.

We are pleased Mr. Chairman, that this committee and the Congress have increased the operations and maintenance funding to the point where training, spare parts acquisition, and the build up of war reserve stocks have all increased. We were at the danger level three years ago. Now, we are approaching acceptable levels of flying time, steaming time, and realistic weapons training. All of those activities are essential to keep our armed forces in fighting trim. This committee and the Congress deserve our thanks for this effort.

Mr. Chairman, we would like to discuss three areas of importance to our members. When you consider the Fiscal Year 1986 defense budget, we would urge you to pay particular attention to these areas. All are controversial; however, in our view, the inclusion of funds in the defense appropriations bill for these systems is absolutely necessary for deterrence, or should deterrence fail, for the protection of our combat soldiers, sailors, and airmen and population.

The first of these areas is the Strategic Defense Initiative. The administration has requested $3.4 billion for research into some of the more promising areas of technological development. We note with interest that one of the more challenging areas of research is in the area of battle management. A sophisticated system must be developed which can receive input from perhaps thousands of sources, decide which targets are real and can be engaged, which weapon will engage them and then issue the commands to engage in the space of a few seconds. When one considers the possibility of a thousand or so warheads being launched simultaneously from the Soviet Union, the problem looks insurmountable. While we are not privy to the classified information necessary to authoritatively say that an effective battle management system is possible, we do have faith in the ability of American industry to rise to the occasion. Who would have thought twenty-five years ago that a television camera could be mounted in the nose of a guided bomb?

Several arguments have been advanced against the strategic defense initiative. One of the first is that the Anti-ballistic Missile Treaty of 1972 prohibits such initiatives. Indeed Article V of the treaty states: "Each party undertakes not to develop, test, or deploy ABM systems or components which are sea-based, air-based, space-based, or mobile land based." Neither the Soviets nor the United States ever envisioned that this would preclude research, in which both nations have since been engaged. The treaty also did not recognize any absolute distinctions between research on the one hand and development on the other. Acceptance of the treaty by both sides was based on a perhaps naive, and certainly incorrect, assumption that further talks would result in significant reductions in the numbers of destructive weapons deployed by both sides. As we now know, arms talks have certainly not led to reductions; therefore, strategic defense, in the absence of significant offensive reductions, becomes imperative.

Critics of the Initiative also point out that what the President is requesting amounts to the militarization of space. We believe that space is already militarized. Both superpowers, and several other nations have launched satellites which have military utility. Both superpowers have tested Intercontinental Ballistic Missiles which travel through space to reach their targets. To deny the use of space to a system which would protect a population from destruction on the premise that space would then be "militarized" when the very weapons it would destroy have already been tested in space, is in our view, intellectually dishonest.

Others say that the development and deployment of such a system will increase the probability of one side or the other launching a first strike. This argument ignores two basic facts. The first and most important is that the United States has never started a war. We have been quick to defend freedom and democracy where it is threatened, and we would do so again. But we have never knowingly and willfully started a conflict. The second basic fact is that even though a defensive system might not be perfect, it would enormously complicate the targeting problems of the other side. If the Soviets should contemplate a first strike, they would, of necessity, order that strike against our strategic retaliatory capability. Without knowing how many of their warheads would survive attack by a defensive system, they could never be sure that we would not have enough missiles remaining intact after an attack to conduct an enormously destructive retaliatory strike. Such retaliation would effectively mean the end of their nation as a political entity.

Our purpose here today is not to attempt to refute every anti-Strategic Defense Initiative argument. Our purpose is to urge your support for a very important initiative which will have the effect of raising the nuclear threshold and making our troubled world a safer place.

The second area of concern to The American Legion is one that invariably raises the level of debate over the defense budget to a highly emotional level. We will attempt to avoid such emotions in our presentation today, recognizing that while honest men and women have honest differences of opinion on this issue, the ability of our armed forces to successfully prosecute a war sometime in the future may very well depend on acceptance or rejection of the premises we will present.

There is considerable evidence that the Soviet Union is continuing to test, produce and stockpile chemical weapons. They have also continued to train and equip specialized forces for the conduct of chemical warfare. A recent Department of Defense study concluded that:

-- The Soviet Union has a military doctrine that envisages the use of chemical warfare and acknowledges its value.

-- The Soviet Union possesses a considerable variety of lethal and non-lethal agents, including nerve, blister, choking, and blood. Toxins are also part of their inventory.

-- The Soviet Union possesses a variety of means to deliver chemical agents including bombs, spray tanks, tactical missiles, artillery and mortar projectiles, rockets, and mines.

-- The Soviet Union can produce very large quantities of chemical agent for chemical weapons.

-- The Soviet Union has large and well-trained chemical warfare forces.

-- The Soviet Union has an active and still expanding chemical proving ground.

-- The Soviet Union provides extensive chemical protection for their forces.

-- The Soviet Union provides intensive chemical warfare training for their forces which includes the use of actual chemical agents.

The United States is only engaged in protection and the training necessary to defend from a chemical weapons attack.

The Institute for Defense Analysis recently concluded that since the United States had no retaliatory capability, a Soviet commander would probably use chemical weapons as an integral part of his initial assault on Western Europe. He would have no incentive not to use them.

The administration is requesting $1.3 billion to support the Chemical Warfare Deterrence Plan, first presented to Congress in 1982. As you are aware, that plan has three parts: continued research and development into defensive measures against chemical weapons; the destruction of obsolete chemical weapons; and the production of deterrent binary munitions which are safe to handle.

The largest portion of the funds are to be spent on additional purchases of protective masks, overgarments, detectors, and other material necessary to provide means of survival in a chemical environment for our armed forces. In addition, there is great concern that the Soviet Union has introduced new and unknown chemical agents into their inventory. There is also evidence that some of these unknown agents have been tested in actual combat operations in Afghanistan and Southeast Asia. The United States is not entirely certain that the protective devices currently available to our troops will protect the wearers from becoming casualties. Clearly, more research is needed to counter the new threats by buying new protective masks and filters and developing new detectors. Research funds are also needed to provide antidotes, decontamination equipment, and vaccines against chemical agents.

The second portion of the program involves the destruction of stocks of chemical munitions in the US arsenal which are unsafe and obsolete. Of the current stockpile, about 10% remains useful as a deterrent. This portion consists of both persistant and non-persistant nerve agent artillery shells and non-persistant nerve agent bombs. An additional 18% has some limited use. This portion consists of non-persistant and blister agents in the form of small caliber artillery, mortars and spray tanks. The remaining 62% is of no use whatsoever to the military and should be destroyed. In late 1984, a panel of scientists recommended that the Army dispose of its stocks of M-55 rockets. These rockets are still in the inventory although no launcher exists for them any longer. The American Legion supports the fund request of $132 million to accomplish the destruction of these obsolete agents and their delivery systems.

The third portion of the program is the most controversial. It involves the purchase of a deterrent capability in the form of binary munitions in a quantity certain to prevent the Soviets from using their own considerable chemical capability against our troops, while at the same time announcing a no-first-use policy and continuing to negotiate a treaty banning these weapons from the world. The Administration has requested $207 million (or 16% of the total requirement for this program) for the production of binary weapons. The American Legion supports this request.

We can think of no better way to insure progress in arms control of chemical weapons than to provide an adequate deterrent capability, which we do not now have. There is no thought of matching the Soviet production capability bomb for bomb and shell for shell. As we understand it, only enough munitions will be produced to insure that the Soviets will think twice about their use. Likewise, we can think of no better method of production than the binary method. It separates the lethal agents into two harmless components. They will be stored and transported separately and would only be installed in delivery munitions upon the request of the commander concerned and the order of the President.

The thought of using chemical agents in combat is as abhorrent to us as it is to most Americans. But the thought of an American Army reduced to 50% effectiveness by being forced to wear protective gear while the bulk of the attacking Soviet forces are not forced to wear it because US troops have no retaliatory capability is even more abhorrent. It is unconscionable to deny our troops the weapons they need to survive on the battlefield when the purchase of those weapons will help to insure they will never be used. In addition, there is a considerable body of evidence that the Soviets will be more amenable to progress at the arms control talks if we show the Soviets that we will not concede the use of chemical weapons to them, but will demonstrate our resolve to use them in retaliation to any Soviet first use.

Mr. Chairman, this program, if carried out in all its parts, insures that never again will American military storage depots contain lethal chemical munitions. Never again will lethal munitions be transported through US cities, towns and port facilities, and never again will our combat forces be exposed to the dangers of handling lethal chemical munitions prior to actual use. At the same time, our forces will be provided with the necessary deterrent tools to help insure that these terrible weapons are never used by either side.

There is one other area which we would like to discuss briefly. The modernization of the US strategic triad is proceeding, thanks in no small part to the actions of this subcommittee. We are pleased that the initial operational capability of the new Peacekeeper will be achieved in late 1986. The Navy will have eight new OHIO class ballistic missile submarines carrying Trident missiles at sea by the end of the calendar year 1985. In short, we are gratified by the progress made in a major modernization effort. We believe that the proof of the effectiveness of this effort is the Soviet presence at the renewed arms control talks in Geneva. We, as do most Americans, belive that the best hope for mankind lies in verifiable agreements to control these terrible weapons. We also believe however, that absent such agreements, the United States must maintain a credible deterrent in the form of modern strategic and conventional forces capable of prosecuting war in any part of the world where the interests of the United States or its allies are threatened. We trust that progress in modernization will continue.

Of particular concern to us at this moment is the future of the Peacekeeper missile which has the support of three Presidents and bipartisan support in the Congress. The Soviets are sitting down with US negotiators in Geneva to begin new arms talks. If the US Congress fails to fund the procurement of additional missiles, the position of our negotiators will be seriously eroded, and the Soviets will have no incentive to make any concessions.

In the words of the President, "the time has come to place this issue behind us. While we have debated the merits of the Peacekeeper program, the Soviets have deployed over 600 Peacekeeper type missiles. If we are to move toward an equitable treaty in Geneva, procurement of 100 Peacekeeper missiles must continue."

We urge the support of this committee to insure that the outcome of the pending votes in Congress are favorable to full deployment. The national security of the nation demands it.

Mr. Chairman, we have provided to the Committee the key resolutions relevant to the security of the United States passed by our National Convention in Salt Lake City. We respectfully request they be made part of the record.

Thank you, Mr. Chairman. We will be happy to respond to any questions.

SIXTY-SIXTH ANNUAL NATIONAL CONVENTION
OF
THE AMERICAN LEGION
SEPTEMBER 3-5, 1984
SALT LAKE CITY, UTAH

RESOLUTION NO.: 60

COMMITTEE : NATIONAL SECURITY

SUBJECT : SELECTIVE SERVICE SYSTEM

WHEREAS, The task of maintaining a state of military preparedness capable of dealing with threats to the nation's security required (1) trained and ready Active Duty forces; (2) trained and ready Reserve forces, and (3) an ability to rapidly expand these forces by resuming inductions should world conditions ever force Congress to order a return to a draft; and

WHEREAS, The Selective Service System has only 276 full-time employees and relies upon a Reserve force as the Systems primary mobilization reconstitution asset; and

WHEREAS, The Selective Service System's Reserve force presently consists of only 728 personnel as opposed to the force of 1335 maintained in earlier years; and

WHEREAS, This Reserve force must be capable, beginning one day after a mobilization is ordered, of expanding the Selective Service national headquarters and six regional headquarters to meet mobilization requirements, and establishing 55 state headquarters and 436 area offices, and of providing liaison officers to each of the 68 Military Entrance Processing Stations; and

WHEREAS, The Department of Defense has stated its emergency manpower requirements call for the Selective Service to maintain the capability to provide the armed forces with 100,000 persons 30 days after a mobilization begins, and 650,000 persons within 180 days; now, therefore, be it

RESOLVED, By The American Legion in National Convention assembled in Salt Lake City, Utah, September 3, 4, 5, 1984, that we urge the Administration and the Congress to authorize and appropriate sufficient funds for the Selective Service System to expand its Reserve force program at a rate consistent with sound personnel management practices until an adequate force is achieved.

RESOLUTION NO.: 61

COMMITTEE : NATIONAL SECURITY

SUBJECT : RAPID DEPLOYMENT FORCES

WHEREAS, U.S. stragegic mobility forces are currently unable to meet NATO reinforcement objectives or to project credible United States forces to areas where our national interest may be threatened; and

WHEREAS, The Army's prepositioned equipment and war reserve stocks are inadequate for many contingencies; therefore, mobility forces, both air and sea, must be increased to provide flexible power projection; and

WHEREAS, The planned conversion of Navy SL-7 container ships to roll-on, roll-off (RO/RO) configuration is essential and high priority must be given to research and development programs for surface ships which will project forces rapidly to augment air-lifted forces in the future; and

WHEREAS, While prepositioning of material configured to unit sets (POMCUS) remain a key part of th strategic mobility picture, critical shortages still exist in the area; and

WHEREAS, The development of intermediate staging sites in the Persian Gulf region is essential to improve the support for the Central Command (USCINCENT) because no combat force can perform its mission if it is not at the right place, at the right time with the right material; now, therefore, be it

RESOLVED, By The American Legion in National Convention assembled in Salt Lake City, Utah, September 3, 4, 5, 1984, that we strongly urge the Congress to authorize and appropriate sufficient funds to provide for the needed U.S. Army strategic mobility improvements.

RESOLUTION NO.: 74

COMMITTEE : NATIONAL SECURITY

SUBJECT : CHEMICAL WARFARE DEFENSE

WHEREAS, Soviet military doctrine envisages the use of chemical weapons, and acknowledges their value, particularly when used in massive quantities and in surprise attacks, they also possess a wide variety of lethal and incapacitating chemical agents and the means to deliver them; and

WHEREAS, The Soviet Union has invested heavily in individual and collective protection and decontamination equipment, and trains with actual chemical agents; and

WHEREAS, In contrast with the Soviet Union during most of the 1970s, the U.S. allowed its retaliatory capability to decline and has done little to improve defense against the use of chemical in wartime; and

WHEREAS, The ultimate goal in the area of chemical warfare is a complete and verifiable ban on the development, production and stockpiling of chemical weapons; until such a ban can be obtained, the U.S. objectives should be consistent with existing treaties and international law to deter the use of chemical weapons; now, therefore, be it

RESOLVED, By The American Legion in National Convention assembled in Salt Lake City, Utah, September 3, 4, 5, 1984, that we call upon Congress to authorize and appropriate monies for chemical warfare defense, to embark on a realistic research, development and acquisition program to deter the Soviet Union's use of chemical weapons; and, be it further

RESOLVED, That we believe this program, which has at its core the production of binary munitions, will improve our chemical defensive ability while providing an incentive for meaningful arms control efforts.

RESOLUTION NO.: 118

COMMITTEE : NATIONAL SECURITY

SUBJECT : STRATEGY FOR PEACEFUL AND MILITARY USE OF SPACE

WHEREAS, The President of the United States has announced a National Space Policy as the result of an inter-agency review which began in August 1981 and which review included a comprehensive analysis of all segments of the National Space Program; and

WHEREAS, This policy reaffirms the national commitment to the exploration and use of space in support of our national well-being and establishes the basic goals of the United States policy to strengthen the security of the U.S., maintain U.S. space leadership, obtain economic and scientific benefits through the exploration of space, expand U.S. private sector investment and involvement in civil space and space related activities; promote international coopertive activities in the national interest, and cooperate with other nations in maintaining the freedom of space of activities which enhance the security and welfare of mankind; and

WHEREAS, It is deemed that the national security of the United States requires the maintenance of space leadership by the United States; now, therefore, be it

RESOLVED, By The American Legion in National Convention assembled in Salt Lake City, Utah, September 3, 4, 5, 1984, that we urge the Administration and Congress to reaffirm the national commitment to the exploration of space in support of our national security and national well-being and that the United States conduct activities in space necessary to its national security including such functions as command and control, communications, navigation, environmental monitoring, warning, surveillance and space defense.

RESOLUTION NO.: 122

COMMITTEE : NATIONAL SECURITY

SUBJECT : B-1B BOMBER AND ADVANCED TECHNOLOGY BOMBER (ATB)

WHEREAS, Over the past several decades, the modernization of U.S. strategic forces has not kept pace with the relentless growth of Soviet nuclear capabilities, our deterrent posture has eroded so that we now face a formidable challenge; and

WHEREAS, An announced comprehensive plan for modernizing our strategic forces includes production of the B-1B bomber in the 1980s while we pursue vigorous development of an advanced technology bomber (ATB) Stealth aircraft for deployment during the 1990s; and

WHEREAS, The cost of maintaining the aging B-52s through the 1990s to the year 2000, including the modifications and essential improvements, would exceed the entire cost of the B-1B program; and

WHEREAS, The B-1B bomber is strategically not just an interim bomber, but a highly versatile aircraft that can function well into the 21st century, and when the Stealth is deployed, can then serve as cruise missile carriers, replacing the B-52s; and

WHEREAS, The Department of Defense stated that the B-1B can be built for the projected cost of $21.5 billion because the engineering is complete, the design is mature and tested, and the basic plane has undergone almost 2000 hours of highly successful flight testing; now, therefore, be it

RESOLVED, By The American Legion in National Convention assembled in Salt Lake City, Utah, September 3, 4, 5, 1984, that we support the President's decision to produce the B-1B bomber now, followed by eventual introduction of the ATB because it is a militarily sound and cost-effective contribution to our nation's strategic force modernization program to improve our nuclear deterrent posture.

RESOLUTION NO.: 130

COMMITTEE : NATIONAL SECURITY

SUBJECT : MILITARY COMMISSARY OPERATION

WHEREAS, The President's Private Sector Survey on Cost Control has recommended that the Department of Defense should terminate the operation of the commissaries in the continental United States except in areas where adequate commercial food stores are not available; and

WHEREAS, That continued need for the military commissary system has been reaffirmed by eminent study groups on numerous occasions; and

WHEREAS, The DOD Third Quadrennial Review of Military Compensation (1976) indicated that the value perceived by the service member substantially outweighs the government costs; therefore, commissaries provide physic income that far exceeds the costs; and

WHEREAS, The Joint Chiefs of Staff on January 13, 1983 recommended that the President resist any attempt to alter military retirement to include benefits; and

WHEREAS, Reduced commissary support would undermine the morale of married careerists which is a key element of military prepardness; it would also be devastating to (1) junior enlisted families; (2) widows; and (3) the 100% service-connected disabled veterans eligible for commissary patronage; now, therefore, be it

RESOLVED, By The American Legion in National Convention assembled in Salt Lake City, Utah, September 3, 4, 5, 1984, that we strongly support retention of the military commissary system and urge the Administration and Congress to provide necessary authorization and funding to allow the system to be preserved as an institutional support for our active duty military, military retirees, 100% service-connected disabled veterans and widows authorized commissary privileges.

RESOLUTION NO.: 131

COMMITTEE : NATIONAL SECURITY

SUBJECT : MILITARY RETIREMENT SYSTEM

WHEREAS, The military retirement system is linked with both the force management requirements and the compensation system for the armed forces; and

WHEREAS, The military retirement system exists to serve the following vital needs;

(a) To provide for a uniform flow of personnel through the personnel structure in order to maintain a young, vigorous and effective force capable of operating both in times of peace and war;
(b) To recognize the long-term voluntary acceptance of highly restricted, disciplined and controlled career in a society where others enjoy greater individual freedoms, and to recognize the arduous nature of duty in the uniformed services;
(c) To maintain a mobilization base of experienced personnel who can be rapidly recalled to active duty
(d) To provide for the long-term financial security of career military members; and
(e) To recognize that the personnel system is a closed entry system where mid and senior grade careerists leaving the system normally can only be replaced by new, entry level accessions; and

WHEREAS, The military retirement system is related to other retirement systems only to meet the objectives of an institutional or corporate entity; and

WHEREAS, In the period of 1980-82, Congress without benefit of public hearings or consideration of the impact on the active force, escalated the rapidity with which piecemeal changes to the retirement system were made -- all apparently driven by budgetary concerns; and

WHEREAS, The President's Private Sector Survey on Cost Control (Grace Commission) has recommended radical changes to the military retirement system which if enacted would severly impact on retention of skilled and experienced personnel; now, therefore, be it

RESOLVED, By The American Legion in National Convention assembled in Salt Lake City, Utah, September 3, 4, 5, 1984, that we believe the current retirement pay system is adequate, provided the temporary changes made by Public Law 97-253 are allowed to expire at the end of Fiscal Year 1985; and, be it further

RESOLVED, That The American Legion insists that any contemplated changes in the retirement system must adhere to the following principles:

a) The retirement system must be fair to both the service members and the tax payer; it must be adequate to attract but primarily to retain the number of quality and experienced personnel required to perform the services' missions;

b) The system must be stable to permit the individual service memeber to satisfactorily plan for the future; however, recognizing that future changes may be necessary, these changes should apply to new service entrants while at the same time honoring commitments to those already retired;

c) The retirement annuity should be indexed to protect its future purchasing power; the same index should apply to all forms of service retirement and the survivor benefits based on the retired annuity;

d) The retirement system must include an optional method for a retiree to provide for survivors; and

e) The retirement system must provide for equitable treatment for all service members entitled to the retirement benefit.

RESOLUTION NO.: 180

COMMITTEE : NATIONAL SECURITY

SUBJECT : SUPPORT THE U.S. AIR FORCE ACTIVE/ARF MIX

WHEREAS, The Air Force, including active duty, civilian, and reserve components, is organized, trained, and equipped as a team - working together to maintain the war fighting capability our nation needs to deter our enemies, and if necessary, to fight and win; and

WHEREAS, The Air Reserve Force (ARF) - the Air National Guard and the Air Force Reserve - have always been key components of the USAF, and today make significant contributions to security and military readiness by peforming combat and direct combat support missions as part of the Total Force; and

WHEREAS, The magnitude of the Soviet threat, its proximity to U.S. vital interests and modern transportation system have reduced the time before we would need reinforcements for our active forces, thus requiring the Air Reserve Force to be constantly ready and available to reinforce the active force; and

WHEREAS, The Air Force is the leader in making the Total Force policy work by having successfully integrated both the Air National Guard and Air Reserve Forces into training exercises and actual war plans and by maintaining a proper and effective mission between the active and reserve forces; and

WHEREAS, The proper Active/ARF mix strikes a balance among national priorities, fiscal realities and the capability to meet a growing threat, and ensures that we have an Air Force which meets the requirements for deterrence, peacetime presence, and immediate response, resulting in a Total Force that allows us to respond to low level contingencies without mobilization, surge military capability during national crises, maintain an active force of sufficient size to sustain the peacetime and wartime logistics, training and personnel needs of both the active and reserve forces, maintain a significant reserve military capability rather than sustain all necessary active military forces, and retain experienced and highly trained people who would otherwise leave the force; and

WHEREAS, In recent years the ARF has assumed an increasing share of Total Force responsibilities, and recent Congressional action has encouraged even greater use of our reserve components while denying active and civilian force manpower increases; and

WHEREAS, ARF growth at the expense of the active force could severely reduce flexibility and severely affect the ability of the Total Force to meet our peacetime and wartime requirements by affecting the number of active force people available to serve overseas and thus eroding our responsiveness to worldwide crises and creating moral problems for the active force through more frequent overseas commitments and family separations; now, therefore, be it

RESOLVED, By The American Legion in National Convention assembled in Salt Lake City, Utah, September 3, 4, 5, 1984, that we urge the Congress to support the Air Force plan for a proper Active/ARF mix which is both prudent and well thoughout in order to prevent any loss in capability or increased costs; and, be it further

RESOLVED, That The American Legion recommend to the Congress that current Active/ARF manpower levels be maintained.

RESOLUTION NO.: 181

COMMITTEE : NATIONAL SECURITY

SUBJECT : SUPPORT ADEQUATE FUNDING FOR SPARE PARTS ACQUISITION PROGRAMS OF THE U.S. ARMED FORCES

WHEREAS, Spare parts are vital to peacetime and readiness and wartime sustainability; and

WHEREAS, The military services identified and are aggressively correcting Spare Parts Acquisition Programs; and

WHEREAS, Past cuts have delayed the services' achievement of planned wartime sustainability; and

WHEREAS, Media "horror stories" about spare parts overpricing must not be permitted to direct attention from the foregoing; now, therefore, be it

RESOLVED, By The American Legion in National Convention assembled in Salt Lake City, Utah, September 3, 4, 5, 1984, that we encourage the Administration and Congress to provide for the funding of spare parts in sufficient amount as may be required to adequately service the military departments, and, be it further

RESOLVED, That we urge the Department of Defense to continue to vigorously enforce the Department of Defense Parts Control Program.

RESOLUTION NO.: 182

COMMITTEE : NATIONAL SECURITY

SUBJECT : STRATEGIC NUCLEAR POLICY

WHEREAS, The United States has considered that global nuclear war would essentially spell the destruction of civilization, a view which led us in the 1960s and 1970s to accept a steady erosion of our military strategic strength through successive enunciated policies which only confirmed our diminishing relative strength; and

WHEREAS, The continued acceptance of such a policy would lead us to a position of inferior strategic strength, vis-a-vis the Soviet Union, by the mid-80s; and

WHEREAS, A strategic policy which would hold our own citizens hostages to nuclear attack in order to deter aggression lacks credibility because of the Soviets recently developed more accurate and more powerful MIRVed ICBMs, having first strike capability; and

WHEREAS, The Soviet Union strategists have long developed their military war machine from the concept of "winning" a nuclear war; and

WHEREAS, In developing their strategic nuclear offensive capability, the Soviets have emphasized their intercontinental ballistic missiles (ICBMs), and have been modernizing that force, stressing improved readiness, greater throw-weight, increased accuracy, better command and control; and

WHEREAS, They have also increased the number of re-entry vehicles and provided hardened silos to improve survivability; and

WHEREAS, There is evidence from the budgets submitted to the Congress that the Administration is attempting to provide our armed forces with improved strategic capabilities to counter the Soviet advances; and

WHEREAS, The development of new capabilities and deployment of anti-ballistic missiles (ABMs) including laser weapons and other scientific break throughs, would enhance the survivability of our ICBMs, strategic bomber bases, defense communication sites, military facilities and the civilian population; and

WHEREAS, The improvement of our manned and unmanned capability to intercept and destroy Soviet aircraft and cruise missiles would appreciably add to the deterrence of enemy attack; now, therefore, be it

RESOLVED, By The American Legion in National Convention assembled in Salt Lake City, Utah, September 3, 4, 5, 1984, that we continue to pursue a new strategic nuclear policy which will lead the U.S. to develop the needed strength to destroy Soviet strategic offensive capabilities, rather than the destruction of soft targets; and, be it further

RESOLVED, That together with the development of these new capabilities that the U.S. develop the force structure necessary to deter the Soviet Union, while minimizing destruction to the United States, if attacked.

RESOLUTION NO.: 183

COMMITTEE : NATIONAL SECURITY

SUBJECT : C-17 AIRCRAFT

WHEREAS, Current airlift enhancement programs, including C-5B and KC-10 acquisition, will satisfy only a portion of the existing inter-theater airlift shortfall; and

WHEREAS, There is a continuing need for additional inter-theater airlift capability including outsize cargo capability; and

WHEREAS, The U.S. Army's development of units that are more easily air transportable, such as light infantry divisions, may increase the requirements for responsive airlifts; and

WHEREAS, The capability to deliver combat units from the continent U.S. directly to small, remote air fields close to the battle area will greatly enhance U.S. ability to rapidly project forces worldwide; and

WHEREAS, Some of the aging C-130 and C-141 aircraft will reach the end of their useful service lives beginning in the mid-1990s; and

WHEREAS, Continued development and procurement of the C-17 is necessary to address these critical airlift requirements; now, therefore, be it

RESOLVED, By The American Legion in National Convention assembled in Salt Lake City, Utah, September 3, 4, 5, 1984, that we urge the Department of Defense, the Congress and the President to expedite development and procurement of the C-17 which will increase and modernize the airlift capabilities of the U.S. Air Force.

RESOLUTION NO.: 229

COMMITTEE : NATIONAL SECURITY

SUBJECT : STRATEGIC DEFENSE INITIATIVES

WHEREAS, Our strategic defense strategy for decades has rested on mutally assured destruction (MAD); and

WHEREAS, The Soviets have continued to increase their nuclear advantage with the obvious intent to arrive at a level where blackmail is inevitable; and

WHEREAS, A new nuclear strategy is long over due that does not hold our people hostage in case of nuclear war; and

WHEREAS, President Reagan, in his historic address to the nation on March 23, 1983, announced a national commitment to the development of strategic defense initiatives to end the age of thermonuclear terror; and

WHEREAS, Under existing treaties, the Soviets have built an extensive air defense and anti-ballistic missile system, the so-called Moscow ABM system providing protection to substantial portions of Western USSR continuing about 75% of the Soviet population and industry and a substantial portion of Soviet military capabilities; and

WHEREAS, The Soviets have used the period since the ABM treaty to greatly increased the ABM capabilities by an all-out research and development program which might or might not violate the aforementioned treaty; and

WHEREAS, We have dismantled our system and an adequate latitude exists for substantial ABM efforts utilizing present and readily forseeable technologies; and

WHEREAS, A continued effort in this area is feasible and practical extending into space as visualized by the President in the future; and

WHEREAS, The President's Commission on Strategic Forces stated that, "Vigorous research and development on ABM technologies--including, in particular, ways to sharpen the effectiveness of treaty-limited ABM systems with new types of nuclear systems and also ways to use non-nuclear systems--are imperative to avoid technological surprise from the Soviets;" and

WHEREAS, All efforts toward strengthening our defense will continue to be challenged by those who promote a posture of unilateral disarmament orchestrated wittingly or unwittingly by the intelligence activities of the Soviet Union; and

WHEREAS, The results of our efforts are plainly understood by the Soviets in that former Soviet Premier Andropov said in Izvestia (March 27) and Pravada (March 28) that he would rely on the "peace movement" -- the nuclear freeze movement -- in the West to sabotage President Reagan's initiative; now, therefore, be it

RESOLVED, By The American Legion in National Convention assembled in Salt Lake City, Utah, September 3, 4, 5, 1984, that we applaud the President's change in the national strategy of deterrence from one of mutually assured destruction wherein populations are held hostage to the threat of destruction from nuclear weapons, to a strategy of protecting our population through defensive measures; and, be it further

RESOLVED, That we urge Congress to support the President's initiatives in reestablishing our anti-missile system effort using all latitudes available including the existing ABM treaties; and be it further

RESOLVED, That vigorous research and development be undertaken to increase our anti-ballistic missile capability using all techniques, including space, as these techniques can be developed.

RESOLUTION NO.: 239

COMMITTEE : NATIONAL SECURITY

SUBJECT : SUPPORT TOTAL FORCE POLICY

WHEREAS, The Reserve components account for more than 40% of the Army's total military strength, the Army's National Guard provides one-third of the total number of Army combat divisions and two-third of the Army's combat service support capability is found in the Army Reserve; and

WHEREAS, The ultimate goal is to have sufficient personnel to man Reserve and National Guard and sufficient equipment for these units at authorized wartime levels; and

WHEREAS, The DOD Reserve Forces Policy Board has issued a report entitled "The Reserve Forces in the 1990s" which concluded that equipment needs in the Reserve and National Guard are serious and that if the Reserve and National Guard are to continue as a viable part of the Total Force, ready for early deployment in both combat and support roles, then the concept of unitary equipment buys, including sufficient spares, mirror image organization and identical equipage must be expanded and accelerated; and

WHEREAS, The National Guard and Reserve strength during the 1980-1990s is predicted to increase the force to authorized levels; now, therefore, be it

RESOLVED, By The American Legion in National Convention assembled in Salt Lake City, Utah, September 3, 4, 5, 1984, that we support the policy of the Total Force and urge the Congress to authorize and fund the National Guard and Reserve Forces to provide sufficient recruiting and retention incentives so as to fully man and equip units at authorized wartime levels in order that they can accomplish their missions in event of war.

RESOLUTION NO.: 262

COMMITTEE : NATIONAL SECURITY

SUBJECT : MODERNIZE THE UNITED STATES AIR FORCE

WHEREAS, The free world has learned a very hard lesson: weakness and appeasement lead not to peace but to war; and

WHEREAS, To keep the peace, we have to maintain strong deterrent forces while we review equitable and verifiable arms reductions agreements with the Soviet Union; and

WHEREAS, Modernization of our strategic offensive forces was generally deferred during the 1970s; and

WHEREAS, The Soviets have deployed 378 SS-20 intermediate range nuclear missiles, more than two-thirds of which are aimed at Western Europe; and

WHEREAS, To maintain a crediable deterrence and a stable nuclear balance, the President, in October 1981, directed that the U.S. Air Force undertake the first comprehensive modernizaton of our strategic forces since they were built in the 1950s and 1960s; and

WHEREAS, The highest priority for our general purpose forces is to improve readiness and sustainability; and

WHEREAS, Since FY 1981 the USAF has more than doubled funding for munitions; and

WHEREAS, Through increased stock of spare parts, the near-term buy of 50 C-5s and 44 additional KC-10s, and a contract to add cargo-convertible features to 19 commercial passenger aircraft will increase air deployable capability of almost 75%; and

WHEREAS, Nevertheless, 17 major studies since 1974 have found in every case that air lift requirements far exceed capabilities; and

WHEREAS, The Congressional Mandated Mobility Study (CMMS) has concluded that programmed mobility capability could not meet current or projected requirements, resulting in the CMMS recommending an Air Force capable of providing a minimum objective of 66 million ton miles per day (MTM/D) of intertheater airlift capability with one-half of the additional force outsize capability; and

WHEREAS, Today our intertheater airlift force, consisting of all sources, including the Civil Reserve Air Fleet (CRAF), can provide only 32.4 MTM/D, with the CRAF representing about 32% of our long range cargo airlift capability and over 90% of U.S. Air Force passenger capability; and

WHEREAS, The CRAF Enhancement Program, which is intended to reduce the shortfall in intertheater airlift, is designed to add cargo convertibility features to new or existing civilian wide body passenger airfcraft and makes these aircraft available to airlift cargo in the event of a national emergency--this program being budgeted for by the

USAF for the retro-fit of four Boeing 747s to a cargo convertible configuration; when completed in 1986, this program will provide for only 9 such aircraft; and

WHEREAS, The only means available to the ground combat forces to deploy and sustain its power is either by air or water; and probably only by air in time to have any significant effect; and

WHEREAS, In theater forces, the USAF must be able to respond to diverse threats in many regions - Europe, Southwest Asia, the Pacific, the Americas and Africa, requiring many capabilities: fighter and reconnaissance aircraft, electronic combat forces, special operations forces, intertheater airlift, specialized combat and control aircraft and conventional strategic bombers; and

WHEREAS, The Soviets are producing approximately 1100 modern tactical fighters per year against our 330, and the Soviet tactical and theater air force consists of over 6,000 fighters, interceptors, fighter-bombers, and medium bombers; and

WHEREAS, In tactical forces, due to steady growth in Soviet military power and steady improvement in their combat capabilities, the USAF needs to continue to modernize and expand its own tactical air force; and

WHEREAS, We expect our casualty load to peak during the first 30 days of conflict and with current limitations, wounded patients could suffer up to 25% fatalities, compared to 3% in Vietnam and Korea, and 5% during World War II; and

WHEREAS, In Lebanon, Israel is having great success in the Bekaa Valley with the use of television carrying Remotely Piloted Aircraft against Syrian anti-aircraft batteries and missiles, chiefly because of their small size, fast speed and their ability to make abrupt and radical maneuvers that an on-board pilot would have difficulty tolerating; and

WHEREAS, In space, both the Soviets and the U.S. are dependent largely on satellites for warning, communications, and command control of their forces worldwide; over the past decade the Soviets have launched four or five times as many satellites as we have, and they have the world's only operational space weapons system; now, therefore, be it

RESOLVED, By The American Legion in National Convention assembled in Salt Lake City, Utah, September 3, 4, 5, 1984, that:

1) We support, as a first priority, the USAF efforts to update strategic modernization.

2) That the USAF give greater emphasis and higher priority to:
   a) global airlift capabilities, with built in casualty handling abilities; and
   b) procurement of tactical, ground support, fighters and fighter-bomber type aircraft

3) That the USAF continue to emphasize its efforts to improve Low Altitude Navigation and Targeting Infrared System for Night (LANTRIN) for enhanced capabilities at low altitudes and during periods of low visibility.

4) That the USAF continue to work to improve vitally important Tactical Command, Control and Communication (C3), in conjunction with the other services, and particularly with the Army and Marine Corps.

5) That the USAF effect close coordination with the other services to avoid duplicating assigned missions.

6) That the U.S. Air Force continues to work in exploring the use of unmanned, Remotely Piloted Aircraft (RPA).

7) That we encourage and support the USAF recent efforts to develop a Unified Space Command.

8) Finally, we urge Congress to ensure modifying government regulations on the manufacturing of aircraft in the U.S. to require that all future aircraft have built in characterizations for rapid convertibility to military usage.

RESOLUTION NO.: 369

COMMITTEE : NATIONAL SECURITY

SUBJECT : SUPPORT OF A STRONG DEFENSE

WHEREAS, The American Legion believes it is the paradox of peace that to preserve it, we must be prepared to use force and use it successfully; and

WHEREAS, Only if we can convince any potential adversary that the cost of aggression would be far higher than any possible benefit, can we be certain that aggression will be deterred and peace preserved; and

WHEREAS, The Soviet Union's military buildup, both quantitative and qualitative, has produced a major shift in the nuclear and conventional balance; and

WHEREAS, The United States has made a conscious choice to restrict its strategic nuclear force development in an effort to encourage similar restraints from the Soviets; instead, they aggressively stepped up their strategic nuclear program and show no signs of slowing; and

WHEREAS, The Soviet Union, in the area of conventional forces, had long held an over-all quantitative advantage; but in recent years that advantage has widened in almost all categories as major weapons are being produced at rates exceeding those of the United States and its NATO allies combined; and

WHEREAS, The Soviet Union's miltary posture has become increasingly offensive in orientation and they have significantly expanded the global reach of their military forces, enhancing their ability to project influence and power; and

WHEREAS, The expansion of Soviet miliary might and their willingness to use it as demonstrated in their invasion of Afghanistan has upset the balance of power that had kept the peace between the superpowers; and

WHEREAS, The President has requested a defense budget authority to Fiscal Year 1985 of $305 billion; now, therefore, be it

RESOLVED, By The American Legion in National Convention assembled in Salt Lake City, Utah, September 3, 4, 5, 1984, that we call upon the Congress to support the President's Five Year Defense Plan (Fiscal Year 1985-89) based upon a policy of peace through strength thereby ensuring a continued national defense posture of readiness, sustainability and modernization.

RESOLUTION NO.: 378

COMMITTEE : NATIONAL SECURITY

SUBJECT : PEACEKEEPER MISSILE

WHEREAS, The mission of Peacekeeper is to insure that deterrence is maintained by restoring to our ICBM force the capability to credibly threaten those hardened assets which the Soviets value most; and

WHEREAS, The peace and scope of Soviet ICBM developments and SILO hardening efforts in recent years have eroded the capability of current U.S. ICBM systems and caused a destablizing imbalance between U.S. and Soviet strategic forces; and

WHEREAS, The Soviets have consistently and systematically violated current Arms Control Agreements; and

WHEREAS, The current Administration has been accused of lack of movement on new Arms Control Agreements, while it is the Soviets who have failed to participate in negotiations; and

WHEREAS, The President's Commission on Strategic Forces (Scowcroft Commission) has concluded that: deployment of MX is essential in order to remove the Soviet advantage in ICMB capability and to help deter the threat of conventional or limited nuclear attacks on the alliance. Such deployment is also necessary to encourage the Soviets to move toward the more stable regime of deployments and arms control; now, therefore, be it

RESOLVED, By The American Legion in National Convention assembled in Salt Lake City, Utah, September 3, 4, 5, 1984, that we support production and deployment of the Peacekeeper missile.

RESOLUTION NO.: 384

COMMITTEE : NATIONAL SECURITY

SUBJECT : MILITARY DRAFT

WHEREAS, 11 years have lapsed since the United States initiated the effort to meet its military manpower requirements through the concept of an all volunteer force (AVF) with a standby Selective Service System theoretically capable of quick reactivation to provide in an emergency; and

WHEREAS, Several underlying assumptions on which those manpower policies were based have changed since the AVF began in 1973; i.e., as stated by the Senate Armed Services Committee: "Soviet military capabilities have increased substantially in terms of quality and quantity of manpower; quantity of sophistication of materials; command, control, communications and intelligence capabilities;" and

WHEREAS, All services are, at the moment, reaching their active duty manpower quotas due in part to an uncertain economy; and

WHEREAS, The cost associated with keeping people in uniform have continued to rise in spite of the increased monetary support for active duty service people; and

WHEREAS, We Americans find it difficult to believe that the problem can be resolved simply by throwing more money at it; and

WHEREAS, Frequent overseas deployments and non-competitive compensation have brought pressures on career personnel that continue to drive them form the ranks in substantial numbers seriously depleting the level of professionalism through the services; and

WHEREAS, The system brings service to the country back into proper national perspective which history has shown to be successful as a substitute for the citizen's direct involvement in his destiny in Selective Service; and

WHEREAS, Any operative Selective Service plan must be completely fair and equitable selection for all concerned; and

WHEREAS, The Military Selective Service Act, as amended, provides a fair and equitable selection system under which 95% of our young, physically qualified men have an equal opportunity to be considered for military service through a lottery system with the stringent controls over deferements; now, therefore, be it

RESOLVED, By The American Legion in National Convention assembled in Salt Lake City, Utah, September 3, 4, 5, 1984, that we support a military draft program as the source of personnel to meet the manpower requirements of our total armed forces.

RESOLUTION NO.: 387

COMMITTEE : NATIONAL SECURITY

SUBJECT : PERMANENT CHANGE OF STATION (PSC) MOVES

WHEREAS, Military people must personally assume an increasingly greater portion of the costs of permanent change of station (PSC) moves; and

WHEREAS, Inadequate reimbursement of officially-directed moves puts military people at an unfair disadvantage and adversely affects retention; now, therefore, be it

RESOLVED, By The American Legion in National Convention assembled in Salt Lake City, Utah, September 3, 4, 5, 1984, that PSC mileage allowances and household goods weight limits must be increased to realistic levels as proposed by the Department of Defense.

RESOLUTION NO.: 388

COMMITTEE : NATIONAL SECURITY

SUBJECT : MODERNIZE THE UNITED STATES NAVY

WHEREAS, Every major conflict since World War I has demonstrated the need for naval superiority in order to conduct successful naval combat against an armed hostile force; and

WHEREAS, The Soviet Union now possesses the requisite number of ships to potentially deny sea superiority to the United States in an armed conflict involving those two nations; and

WHEREAS, Soviet use of sea power has allowed them to challenge U.S. influence in areas of the world most critical to the security of the United States; and

WHEREAS, Our national survival and the security of our allies depend on the ability of the United States to maintain sea superiority in order to foster the strategic sealift capability, power projection capability and the strategic combat capability of the U.S. Navy; now, therefore, be it

RESOLVED, By The American Legion in National Convention assembled in Salt Lake City, Utah, September 3, 4, 5, 1984, that we urge the Administration and the Congress to continue to provide the necessary funding to modernize; the U.S. Navy in order to maintain the most-up-to-date equipment available for the close sea support capability, strategic sealift and sea superiority roles assigned as the Navy mission.

RESOLUTION NO.: 394

COMMITTEE : NATIONAL SECURITY

SUBJECT : ARAPAHO PROJECT (NAVAL RESERVES)

WHEREAS, The Naval Reserve mission, in the event of mobilization, is ASW support; and

WHEREAS, The Naval Reserve forces lack a ready, mobile aviation facility capable of being transported to port facilities to supplement the regular Navy convoy mission; and

WHEREAS, In order to train for their assigned mission, the Reserves currently need to remove active, high-value ships from the ready forces for their periodic proficiency training to provide realism and independence of action; and

WHEREAS, Naval Rererve forces stationed inland must currently be transported to a costal station to give such training for any semblance of realism; and

WHEREAS, ARAPAHO provides an ideal platform for both the convoy escort mission and the training of Reserve forces in that it can be loaded on-board merchant ships indigenous to the convoy to provide a self defense capability, placed on such a ship from the Reserve for short-term training, or even assembled ashore for such training; and

WHEREAS, The ARAPAHO facility developed and owned by the U.S. Navy and currently on lease to the British Royal Navy is due to return next spring to the United States; now, therefore, be it

RESOLVED, By American Legion in National Convention assembled in Salt Lake City, Utah, September 3, 4, 5, 1984, that upon its return in the spring of 1985 from the British Ministry of Defense, that the Navy consider placing the Navy's ARAPAHO prototype aviation system in Naval Reserve custody properly outfitted and equipped, and be used in advanced analysis involving Reserve missions (such as ASW) and functions in support of the action established.

RESOLUTION NO.: 462

COMMITTEE : NATIONAL SECURITY

SUBJECT : EDUCATIONAL INCENTIVES FOR ACTIVE AND RESERVE FORCES

WHEREAS, Congress has terminated the education program under Chapter 34, Title 38, U.S. Code, for those persons enlisting in the armed forces of the United States on or after January 1, 1977; and

WHEREAS, Congress replaced this educational assistance program with a less generous experimental contributory program under Chapter 32, Title 38, which is known as the Post-Vietnam Era Veterans Education Assistance Program, or "VEAP," wherein the Federal Government matches on a two-to-one basis the deposits by the individual military member to VEAP; and

WHEREAS, The Secretary of Defense is authorized under this program to contribute additional unspecified amounts to an individual's VEAP account above that level as a recruiting or retention incentive; and

WHEREAS, The armed services have testified that the VEAP program is not effective as a recruiting and retention tool; and

WHEREAS, All military services are currently experiencing great success in recruiting and retaining military personnel due to adverse economic conditions but it is apparent that this problem will worsen in the 1980s as the number of 18-year old personnel decline to 1.7 million in the latter part of the decade, thus requiring the services to recruit 50% of all military age males who are physically and mentally qualified and who are not enrolled in college in order to meet the manpower need of the services; and

WHEREAS, The American Legion believes that educational incentives play an important part in the recruitment and retention of personnel, and any attempt to restrict or delete such benefits as a cost-saving measure would adversely affect the military services ability to meet their accession and retention goals; now, therefore, be it

RESOLVED, By The American Legion in National Convention assembled in Salt Lake City, Utah, September 3, 4, 5, 1984, that we urge Congress to enact legislation which would authorize and fund an effective education incentive program to support retention and recruiting for Active and Reserve forces; and, be it further

RESOLVED, That The American Legion recommend to Congress that any such educational incentive program be funded by the Defense Department but be administered by the Veterans Administration since the VA currently has staff and expertise to administer such a program.

RESOLUTION NO.: 467

COMMITTEE : NATIONAL SECURITY

SUBJECT : MODERNIZATON OF NATIONAL DEFENSE INDUSTRIAL BASE

WHEREAS, A productive industrial base is an important part of our national security posture and is a vital deterrent to conflict, just as are competent personnel armed with superior weapons; and

WHEREAS, Without a responsive industrial base forging the weapons required by our armed forces at a high level, our national security interests are handicapped severely; and

WHEREAS, The ability of America's defense industries to arm U.S. forces and those of our allies in time of conflict has been a major factor in preserving the nation's independence; and

WHEREAS, In recent years, many subcontractors and producers of military hardware have been forced out of the defense business because of on-going procurement policies, impairing the national readiness; now, therefore, be it

RESOLVED, By The American Legion in National Convention assembled in Salt Lake City, Utah, September 3, 4, 5, 1984, that we urge the Congress to aid in the modernization of the nation's industrial base, including shipbuilding facilities, to strengthen our defense capabilities and insure national security.

RESOLUTION NO.: 526

COMMITTEE : NATIONAL SECURITY

SUBJECT : SUPPORT FOR A STRONG U.S. NAVAL SERVICE AND U.S. MARINE CORPS RESERVE

WHEREAS, The U.S. Naval Reserve and the U.S. Marine Corps Reserve have been essential arms of the United States military for many years; and

WHEREAS, The U.S. Navy with Congressional and Administration support has embarked on a modernization effort for the U.S. Naval and Marine Corps Reserve; now, therefore, be it

RESOLVED, By American Legion in National Convention assembled in Salt Lake City, Utah, September 3, 4, 5, 1984, that we urge Congress and Administration to support the efforts of the U.S. Navy to modernize the U.S. Naval and Marine Corps Reserve to insure that they have the necessary resources to obtain and maintain a high standard of readiness.

RESOLUTION NO.: 603

COMMITTEE : NATIONAL SECURITY

SUBJECT : SELECTIVE SERVICE SYSTEM

WHEREAS, The defense of the nation requires the maintenance of a system of military manpower procurement equal to meeting the needs of present and foreseeable defense commitments as well as primary mobilization demands; and

WHEREAS, The Selective Service System has proven itself to be fully effective in meeting the vital national needs during all wars this nation has been engaged in during this century, as well as the requirements of the peacetime Army since World War II until 1973; and

WHEREAS, The current registration program has been highly successful; and

WHEREAS, A viable Selective Service system with registration is the minimum to meet the necessary mobilization requirements; now, therefore be it

RESOLVED, By The American Legion in National Convention assembled in Salt Lake City, Utah, September 3, 4, 5, 1984, that we support: (1) the maintenance of the Selective Service System as a viable preparedness measure; (2) the continuation of the current registration program; (3) supports local boards in a registrant's own community having the responsibility for determining his availability and the issuance of induction orders rather than depend on an untried, centralized computer system; (4) supports the training of Reserve and National Guard personnel in Selective Service Manpower Mobilization Procedures; and, be it further

RESOLVED, That the President and the Congress be urged to provide the necessary budgetary support for the Selective Service System so that the mandates of the Military Selective Service Act are enforced and the Selective Service System is able to meet the manpower requirements of the Department of Defense when called upon.

IMPROVEMENT IN PROCUREMENT AND PERSONNEL MANAGEMENT

Senator STEVENS. Thank you very much.

I remember so well my membership on the legislative commission representing Alaska. I am delighted you are here keeping up the tradition.

Mr. Sasser.

Senator SASSER. No questions, Mr. Chairman.

Senator STEVENS. We appreciate your testimony and your prepared statement will also be placed in the record.

Mr. MILLER. Thank you very much.

U.S. COUNCIL FOR AN OPEN WORLD ECONOMY

STATEMENT OF DAVID J. STEINBERG, PRESIDENT, U.S. COUNCIL FOR AN OPEN WORLD ECONOMY

BUY-AMERICAN STRICTURES

Senator STEVENS. Mr. Steinberg is next.

Mr. STEINBERG. Thank you, Mr. Chairman.

I am David Steinberg, president of the U.S. Council for an Open World Economy.

The council is a private nonprofit organization engaged in research and public education on the merits and problems of developing an open international economic system in the overall national interest. We do not speak on behalf of any special interest.

As in past appearances before your subcommittee, Mr. Chairman, I am urging reassessment and overhaul of the hodgepodge of buy-American regulations that affect defense procurement.

Although I urge a more coherent and more deliberate free-trade policy than we have ever had before, indeed more coherent and more deliberate than any other freetrader I know of is advocating, I recognize the need for occasional import restrictions including the possible need and advisability of buy-American regulations in defense procurement.

But these buy-American strictures should be only component parts of coherent balanced strategies that address the real problems and the real needs of the industries that are the beneficiaries of the subsidies, for subsidies they are.

The benefits of these buy-American regulations should be worth the cost that they represent to the Nation as a whole.

I am recommending today, as I have in the past, that in preparation for next year's defense budget the Congress this year ask the President or alternatively ask the General Accounting Office to analyze, and to reassess, the whole buy-American picture affecting defense procurement.

Senator STEVENS. You requested that last year and we did that. We have it here for you to review. It has been done by the GAO.

Have you received copies of this?

Mr. STEINBERG. No, sir. I tried to find out if something was done and nobody on your committee staff told me that it had been done.

Senator STEVENS. We will be happy to provide you with a copy of the letter that went to the Secretary of Defense from the General

Accounting Office pursuant to the request that I made in June of 1984 following your last testimony.

Mr. **Steinberg**. I knew you were receptive at that time, Mr. Chairman.

Senator **Stevens**. We will give you an opportunity to study it and you send us a letter and give us your comments after you have studied it.

Mr. **Steinberg**. Good.

Thank you very much.

Senator **Stevens**. Thank you.

[The letter follows:]

U.S. Council for an Open World Economy
INCORPORATED
7216 Stafford Road, Alexandria, Virginia 22307
(202) 785-3772

April 26, 1985

Senator Ted Stevens
Chairman
Subcommittee on Defense Appropriations
United States Senate
Washington, D.C. 20510

Dear Mr. Chairman:

In the course of my recent testimony before your Subcommittee in hearings on defense appropriations for fiscal 1986, you indicated that, responding to my continuing advocacy of reassessment and overhaul of the Buy American strictures affecting defense procurement, you had sought and obtained a compilation of these requirements. You invited my comments on that review. I appreciate this invitation.

Although the review (prepared, I believe, by the General Accounting Office) is helpful in identifying the types of Buy American requirements affecting defense procurement (it in fact only supplements the compilation I have been presenting to the Subcommittee), it does not constitute an adequate response to the proposal I have been making for many years in defense appropriations hearings. Beyond enumeration of the wide range of Buy American requirements, I have also urged an assessment of (a) the extent to which they serve the national interest and the real needs of the industries that benefit from these subsidies, (b) how these strictures relate to other steps being taken to strengthen these industries (including how Buy American requirements can be justified in the light of other measures being taken to help these industries), (c) the cost of these requirements (however rough the estimates) in financial and other terms (including special inventory and other costs that may be incurred by U.S. companies producing for both military and civilian contracts), and (d) the pattern of Buy American rules (to the extent they are advisable) that would best serve the national interest and the defense interest per se (correcting what I view as a hodgepodge of "macro" and "micro" subsidies). I have urged integration of Buy American requirements affecting defense procurement into coherent, systematically reviewed, industry-adjustment strategies as the framework for whatever assistance the government deems necessary for the industries concerned.

Among other benefits, such reassessment and overhaul would reveal the government's determination to get a handle on an aspect of the huge defense budget that has long escaped rational, responsible concern by both the executive and legislative branches of government, and most everyone else. If we have to have Buy American rules in defense procurement for legitimate, carefully reasoned purposes, we ought to structure these strictures properly and subject them to systematic review to make sure they function most productively and last no longer than the national interest demands.

I hope the Subcommittee will engineer a request to the General Accounting Office or the Office of Management and Budget, calling for a thorough report before the end of calendar year 1985 along the lines proposed in my testimony and in this letter.

Sincerely,

David J. Steinberg
President

U.S. COMPETITION AGAINST SUBSIDIZED FOREIGN FIRMS

Senator **Proxmire**. Mr. Steinberg, if we phase out the buy-American rules, won't that put some American firms at a disadvantage when competing against subsidized foreign firms?

If we allow more defense procurement to be purchased abroad, does this not reduce our industrial base?

Mr. **Steinberg**. I propose the phasing out of buy-American requirements to the extent only that they are not needed as component parts of coherent industry-adjustment strategies addressing the real problems of industries needing and deserving government help. I also propose restructuring buy-American requirements so as to remove those that unduly duplicate or unjustifiably exceed buy-American rules more suitable for the purposes intended.

Foreign subsidies that pose substantial problems for U.S. producers should be dealt with through antisubsidy procedures in U.S. trade legislation and other ways more conducive to the national interest than the buy-American requirements now in existence. Allowing more defense procurement to be purchased abroad will not reduce our industrial base so long as coherent efforts are made, through balanced industrial-adjustment strategies, to keep this from happening. We have no such strategy today.

My prepared statement addresses these issues in greater detail.

[The statement of Mr. Steinberg follows:]

U.S. Council for an Open World Economy

PREPARED STATEMENT OF DAVID J. STEINBERG

PRESIDENT

(The U.S. Council for an Open World Economy is a private, non-profit organization engaged in research and public education on the merits and problems of developing an open international economic system in the overall national interest. The Council does not act on behalf of any "special interest".)

Buy American regulations affecting defense procurement are a hodgepodge of "macro" subsidies (affecting all forms of defense procurement) and a wide assortment of "micro" subsidies imposing more-restrictive rules on procurement of specific products from textiles to tools, from food to flatware. Long overdue is the need to prune this thicket of Buy American strictures -- in a different metaphor, to cull this herd of sacred cows. Motivating this proposal is not purist, ideological devotion to a free-trade ideal which has no place for buy-national practices in government procurement. The objective, rather, is limitation of Buy American regulations to carefully chosen, systematically reviewed rules whose benefits to the national interest are deemed worth the cost.

The purposes of this policy overhaul would include making the most effective use of limited financial resources (thus helping to reduce the government's budget deficit), combatting inflation, helping many U.S. manufacturing industries themselves to operate more efficiently (through freedom to obtain and handle component materials most economically), and making certain that Buy American aid to specific industries (if justifiable at all) is a carefully reasoned component of coherent strategies addressing the real problems of industries that need and deserve government help.

Warp and Woof of Buy American Rules

The basic Buy American policy affecting defense procurement dates back to the Great Depression: to the Buy American Act of 1933 (affecting U.S. Government across the board). This was supplemented in 1954 by an executive order establishing a basic six-percent subsidy for domestic suppliers, and in 1962 by an executive order giving a 50-percent advantage, for balance-of-payments purposes, to domestic firms seeking U.S. defense contracts. Beginning in 1956 with textiles and apparel, more-restrictive rules were enacted by Congressional initiative, mandating procurement of an assortment of products from domestic producers only, except for purchases not exceeding $10,000 and for situations where the supplies needed are not available from U.S. sources at fair prices or are needed for combat or other emergency purposes abroad, for vessels in foreign waters, or involve perishable foods for U.S. installations abroad. One of the best known of these "micro" regulations concerns products containing specialty metals (since 1972), including stainless steel and explicitly stainless steel flatware.

Some products have been exempted from the general Buy American stricture by a multilateral trade agreement negotiated in the late 1970's, others (specialty metals and certain textiles) by Congressional waivers in the interest of NATO standardization and interoperability and, applicable to other countries as well, to help "offset" foreign purchases of military equipment from the United States. The specialty-metal waivers for NATO and "offset" purposes (established in 1977) were terminated in the defense appropriations act of 1981 under pressure from labor and management in the specialty-steel industry. The defense appropriations bill for fiscal 1983, as parsed by the Senate in 1982, restored these waivers, but this provision failed in the House of Representatives and a less-than-adequate substitute was adopted by Congress. Congress reinstated the 1977 waivers in the 1983 legislation for fiscal 1984.

In 1982, a defense authorization amendment to prohibit choice of a non-U.S. supplier as sole supplier of any item of military equipment was restricted, in its enactment form, to major systems only, as defined by the Secretary of Defense. Buy American requirements were also added in 1982 restricting to U.S.-mined coal or coke the defense procurement of such fuels for use at U.S. military installations in Europe. The defense appropriations act in 1983 restricted to American-made products the defense procurement of hand or measuring tools, including power tools. In its report on the defense appropriations bill for fiscal 1985 (Report 98-1086, dated September 26, 1984), the House Committee on Appropriations declared its intention that "any electric or air-motor driven hand tool shall be considered to be of domestic origin if 75 percent of the cost of material in all of its components has been manufactured or produced in the United States" (p.263). This definition addressed the concern that some of the many parts of such tools are difficult or impossible to obtain from U.S. domestic sources. In 1983, legislation was enacted prohibiting replacement for the CT-39 aircraft "from other than a United States firm and such replacement aircraft must be assembled in the United States and utilize an airframe manufactured in the United States" (part of H.R. 3069, Supplemental Appropriations for Fiscal 1983).

We are not aware of any effort by the Department of Defense to seek any modification of any existing Buy American requirement, other than the effort made to get the 1977 specialty-metals waiver reinstated. Nor has any other government agency or the White House or any Congressional committee sought reassessment of the "micro" forms of Buy American requirements affecting defense or any other sector of government procurement. Only the Office of Management and Budget has looked into possible reform of the Buy American Act. In 1981, the Office of Federal Procurement Policy in OMB initiated a project aimed at simplifying implementation of the Buy American Act. To our knowledge, no action has been taken to secure such reform, itself seeming far less than what is needed.

Lack of Coherent Industrial Policy

Buy American strictures in defense procurement, even those dealing explicitly with specific products, are not components of coherent policies of government aid to ailing industries, not even to those industries considered essential to defense mobilization. For example, there is no coherent textiles policy addressing the real problems and needs of the U.S. textile industry -- a policy in which the Buy American requirement on textiles might be expected to play a part. Nor a coherent specialty-metals policy as the framework for the Buy American rule on specialty metals. Nor does the government know what the Buy American requirements in defense procurement cost, their contribution to the strength of the particular industries, how long these measures may be needed, what alternative or supplementary measures may merit adoption, and why "micro", specific-product Buy American requirements are needed over and above the "macro" rules of overall Buy American standards.

Instead of coherent, cost-efficient strategies addressing the real problems of industries meriting government help, we have simplistic, costly concessions to political pressures for government protection against foreign competition. With some exceptions, the Buy American requirements are kept without change, year-in and year-out, no matter the need for well-designed efforts to solve industrial problems, increase industrial productivity, reduce subsidies, combat inflation and use most efficiently and productively the funds provided by American taxpayers. The cost-increasing, inflationary implications of Buy American requirements in defense procurement include the tendency of the specific-product strictures to increase costs for U.S. manufacturers who may find it necessary to incur special inventory and other expenses where production for defense contracts must be kept separate from non-defense production of similar items.

To the extent that the industries purportedly needing government assistance are essential to national security, there is all the more reason to deal incisively with their real problems. Subsidizing such industries through Buy American requirements or other import controls is badly conceived attention to the mobilization base, besides being bad economics and shabby politics. To the extent that these industries need and deserve government help, such assistance should take the form of redevelopment strategies (involving appropriate commitments by government, industry and labor) designed so to strengthen these sectors of the mobilization base that these industries might become viable without barriers against foreign competition (assuming they are not in this condition now). To the extent that any of these industries cannot survive without import barriers of some kind, yet must be preserved for legitimate national-security purposes or other reasons germane to the national interest, the American people have a right to know how, and how effectively, these import restrictions are helping to cure whatever problems warrant such government aid, and at what cost to the taxpayers (if such an estimate can be calculated without unreasonable expense).

Easy recourse to import restrictions tends to divert attention from the tougher, more responsible task of carefully diagnosing the real problems and needs of industries that may need and merit government help. It is policy laziness we can no longer afford, involving costs (financial and otherwise) that get higher as years pass and as the need for policy perfection grows more urgent. The huge proportions of the defense budget, particularly at a time of massive budget deficits that must substantially be reduced, make these reforms all the more necessary.

Plan Now for Fiscal '87

I am not asking for outright termination of the defense-related Buy American rules this year or in the near future. Nor would I advocate their termination at any other time just on the basis of ideological belief in allowing market forces full sway. I am not unmindful of political realities, policy practicalities, and the possibility that government assistance, including Buy American rules in some measure, may be needed to facilitate industrial-redevelopment strategies in the total public interest. Moreover, to remove these Buy American regulations abruptly, without adequate notice in the interest of orderly adjustment, would not be in the national interest. What I do urge at this time is that, in preparation for fiscal 1987 defense appropriations, Congress this year ask the Prerident to reassess the Buy American requirements affecting defense procurement and report to Congress in late 1985 or early 1986 on (a) the full scope of these requirements, (b) the extent to which they serve the national interest and the real needs of industries that benefit from these regulations, (c) other steps being taken or that should be taken to strengthen these industries within the framework of coherent industry-redevelopment strategies, (d) the cost of these Buy American strictures in financial and other terms, and (e) the pattern of Buy American rules (macro and micro), to the extent they are advisable at all, that would best serve the total national interest and the defense interest per se. As an alternative to requesting such assessments from the President, Congress should consider asking the General Accounting Office to produce the analysis I have proposed.

NAVAL RESERVE ASSOCIATION

STATEMENT OF CAPT. CHARLES A. BUESENER, NAVAL RESERVE ASSOCIATION

NAVAL RESERVE FUNDING

Senator STEVENS. Our next witness is Capt. Charles Buesener, Naval Reserve Association.

Captain BUESENER. Thank you, Mr. Chairman.

I must again apologize for our president, Captain Rice. He is indisposed in New Orleans. He is unable to get an airplane and fly up today.

I am a retired naval aviator designated in 1954, 30 years of active duty, 2 years in the Pentagon, OP05. I retired as commanding officer of the Naval Air Station, Willow Grove, PA, a year and a half ago.

Having had the benefit of your guidance last week, I recognize that our testimony today is going to be difficult because we are asking for additional funds. The fact of the matter is that we would much prefer to come up and support the program that was submitted by the Department of Defense for the Naval Reserve.

Unfortunately we feel that there are some gaps in the program that are vital to the Naval Reserve's continued viability and readiness and capability in response to recall.

It is interesting of the $3.5 billion Reserve equipment budget this year, not one aircraft is in that budget for Naval Reserve squadrons.

We appreciate the opportunity to come here and we appreciate your continued support.

In the fiscal 1985 budget congressional add-one provided funds for modernization of the F-14's, acquisition of the UH-60 combat search and rescue helicopters and acoustic display update program for the P-3A/B aircraft in the Reserve.

Once again, the Naval Reserve this year presents for your consideration issues we are convinced are of vital importance to the continued present and future improvement of the Naval Reserve Force.

RESERVE MARITIME PATROL SQUADRONS

Our Reserve Maritime Patrol Squadrons. Admiral Watkins, referring to the Soviet submarine threat, states and we concur:

> The Soviet submarine threat, in particular, is dramatically increasing in numbers and quietness. We offset that quantitative disadvantage by qualitative superiority. Qualitative superiority is made possible only through continuing efforts at fleet modernization.

RESERVE VP SQUADRONS

The Reserve VP squadrons, which comprise 34 percent of the total force, face block obsolescence in the 1990's. An annual procurement of 20-22 P-3C aircraft is required to meet total force requirements by that time. The Naval Reserve Association recognizes that level of sustained procurement is not feasible.

The last of six in the mid-1990's in the face of the Soviet increasing threat is a dangerous situation.

Consequently, the NRA proposes a two-pronged approach combining slightly enhanced aircraft procurement and an acoustic processor AQA-7 (V 11-12) improvement, which we feel offers an affordable mix that will enable the Reserve Maritime Patrol Force to meet the threat of the 1990's.

P-3C UPDATE III

The NRA recommends that Congress increase the procurement rate of nine P-3C update III aircraft to 12 per year by adding $100-$105 million to fiscal year 1986 budget request and further recommends placing this procurement rate under multiyear procurement contract, to affect the 12 to 14 percent savings inherent in multiyear procurement.

Regardless of which P-3C update III procurement rate is funded, significant numbers of P-3A/B aircraft will require service life extension program and avionic update if reserve force levels and capability are to be maintained in the 1990's.

The final avionic modernization programs for these older P-3A/B, the TAC/NAVMOD and AQA-7 triple vernier, will be completed in the late 1980's. No further upgrade is currently planned for these aircraft even though they will be operated by the Reserves past the year 2000.

AQA-7

The proposed AQA-7 Processor Enhancement Program if authorized and funded, will enable system development and testing to be accomplished by fiscal year 1988 so that appropriate sensor upgrade can be accomplished to enable P-3A/B aircraft to meet Soviet submarine threat of the 1990's.

The Naval Reserve Association recommends the Congress authorize and fund the procurement of five service test models of the AQA-7 processing enhancement kit, including environmental and reliability testing at a cost of $10.5 million in fiscal year 1986. This is a one-time cost of $10.5 million.

LAMPS MK-1 HELICOPTER

Lamps MK-1 helicopters is another ASW system. It is the aircraft that provides the long-range ASW for our escort ASW frigates. We propose that Congress allocate $4.5 million of the $69.9 million requested in fiscal year 1986 for SH-2 procurement toward advanced procurement for six aircraft procurement in fiscal year 1987. This out-year procurement profile will provide two Lamps MK-1 helicopters per FFG-7 deck and meet Coast Guard WHEC requirements.

The Naval Reserve Association has been informed that the fleet modernization plan will install toward array on all of the Naval Reserve frigates by fiscal year 1988. We fully support this program which when accomplished will enable the NRF frigates to perform their ASW mission.

AN/SQR-17A

The Naval Reserve Association recommends that Congress provide $6.8 million to fund this engineering change to the AN/SQR-17A system and to manufacture three onboard simulators for suitability evaluation onboard reserve FFG-7/1052 class ships of the Naval Reserve Force.

COOP PROGRAM

The mine warfare Craft of Opportunity Program [COOP] was started last year. It is continuing. The Navy is giving this program adequate support. Our view is that it is in its very embryonic stage and we urge a continued congressional support for this program as more specific requirements are developed over the years.

NAVAL RESERVE TACTICAL AIR WINGS

The Naval Reserve Tactical Air Wings have continued their modernization program. They are now transitioning to F-14's. The second air wing is transitioning to F-14's in the next year and a half primarily due to the add-on for the avionic modernization program that was added on by Congress last year.

We do have shortfalls in the A-6E, EA-6B and E-2C aircraft. These shortfalls will, if not overcome by an adequate procurement profile, leave gaps in the tactical air wing capability if and when they are recalled.

S-3 PRODUCTION

Further, the NRA recommends consideration be given to future reopening of the S-3 production if the active Navy so pursues this because currently there is no fixed wing ASW capability in the Reserve air wings due to lack of aircraft.

HAL/HC SQUADRONS

The HAL/HC squadrons represent 200 percent of the Navy's capability in combat search and rescue. They are vested in the Reserves. NRA proposes that four UH-60 helicopters by procured in fiscal year 1986 at a cost of $25 million.

This transition program from the older helicopters that are currently flying was initiated last year with a two-plane add-on by Congress. Inexplicitly this was not followed up by the present budget supplement. We understand by the time the add-on came along the budget had progressed to such an advanced stage that the Navy was unable to reprogram the necessary funds.

We have been told that they are going to submit procurement of these aircraft for this purpose in next year's budget and we are recommending the consideration be given to procuring four this year to continue the transition that has already started in the squadrons and keep an orderly flow of transition. Cost of this program is $25 million.

ARAPAHO

Arapaho, a much maligned system providing for container ship modification to warfare roles. The Naval Reserve recommends funding be provided to construct two of these systems, one in 1987 and one in 1988.

The Navy, I understand, in their long-range planning is supporting the development of this system for mine countermeasures, mother ship type operation, so that in an incident similar to the last year's Suez situation, that type of ship can be used instead of removal of dedicated gray hulls from another mission to supply these command and control and support functions.

NAVAL RESERVE STRENGTH

NRA recommends continuation of the current Selective Reserve bonus programs scheduled to expire at the end of fiscal year 1985 and the NRA further recommends the astablishment of the TAR Reenlistment Incentive Program proposed in the fiscal year 1986 budget request.

EXPANDED RECALL AUTHORITY

The NRA recommends that consideration be given to increasing both the numbers of personnel and the length of service they can be called up for by the President in the case of national emergency. This places our constituency in greater jeopardy.

However, we are strongly convinced that the increased role of the Naval Reserve and total force demands both an increase in numbers and increase in the length of time that they can be applied to a situation, particularly in some of the support functions such as cargo handling battalions where we have 75, 76 percent of the capability.

We envision that a 90-day call up, for example, will not be sufficient and it ought to be at least increased and the option extended to keep them 180 days or longer. If we do not want to play ball in the total force, you just can't justify continued migration of missions to the Reserves.

NAVAL RESERVE COMMAND

The NRA fully and strongly supports the upgrading of the Chief of Naval Reserve to three-star rank and the creation of a DONO—Naval Reserve—on the staff of the Chief of Naval Operations.

CONCLUDING REMARKS

Mr. Chairman and committee members, we appreciate your interest in continuing to provide the Guard and Reserve with capable modern weapon systems. These are essential to maintain a high level of readiness and performance.

However, it is easy to transfer missions from the Active Force to the Reserve components. The hard part comes when you have to equip the transferred Reserve Force with weapon systems necessary to meet the threat. The threat is just as strong against the reserves as it is against the Active Force.

So, the requirement particularly in the ASW game is not generated by any other than the Soviets. If the Russian submarines get quieter and we can't find them, we are not getting a good bang for the buck. We are wasting money. If you cannot do the job, you should not be in the ball game.

That is what we urge.

Thank you.

[The statement of Captain Rice follows:]

Prepared Statement of Capt. John C. Rice, Jr. (USNR)
National President
Naval Reserve Association

Mr. Chairman, Committee members, we appreciate your allowing the Naval Reserve Association to provide testimony to the Committee for your consideration. The Congress has the attention of the services, particularly in the Navy where the joint effort by Congress and Secretary Lehman have created a new interest in the Naval Reserve. We now ask you to follow through on the movement to furnish the Guard and Reserve with the equipment to give them a current warfighting capability. We are concerned that if the Guard and Reserve units, which assume the additional responsibilities as a result of the expanded or new roles assigned to them, are not supplied with the combat capable equipment to go with the responsibilities, that the effort to make the Reserve Components more responsive to national security requirements will become "dead in the water".

The Naval Reserve Association will continue its efforts to support the modernization and improvement of the capabilities of the Naval Reserve. Total Force planning, programming and budgeting is the key. Secretary John Lehman, Jr. in his Fiscal Year 1986 Posture Statement reaffirmed his policy of "horizontal integration" stating:

> "Four years ago the Department of the Navy undertook a major reorganization of Reserve Components to move from a vertical to a horizontal relationship with the active forces. That means essentially that the Reserves must provide immediate augmentation to the active force in time of emergency across the entire spectrum of warfare. It means also that, in peacetime, we rely on Selected Reserves to provide real-time fleet support across their mission areas. To execute this common-sense policy, the Reserves must have equipment compatible with the active forces. For instance, instead of providing the Reserves only such equipment as becomes obsolete and is removed from the active force, there must be a spectrum of new and old equipment reflected in the Reserves parallel and in the same proportion as in the active force. We have taken fundamental steps to bring this about.
>
> "o Modern FF-1052 and FFG-7 Frigates have been transferred to the Naval Reserve Force with a total program of 26 frigates planned by 1990.
>
> "o The first Reserve squadron has now transitioned to the F/A-18 and another squadron to the F-14A.
>
> "o Modern A-7E, E-2C, SH-2F, and HH-60 aircraft have been or are being transferred or acquired for Reserve units this year with other fleet aircraft to follow during the current five-year plan.
>
> "o Squadron augmentation flying units have been established and have been operating successfully with each active duty air wing, providing

current-trained aviators and maintenance personnel for immediate augmentation to active duty squadrons.

"The Naval Reserve contains several components which only exist in the Reserves: 100 percent of the Navy's U.S.-based logistic airlift squadrons, 100 percent of light attack helicopter squadrons, 100 percent of our combat helicopter search and rescue capability, 100 percent of naval mobile inshore/undersea warfare units -- "The Brown Water Navy" structure for combat on inland waterways. Upon mobilization the Reserves provide 99 percent of naval control of shipping, organization manning for merchant ship mobilization and convoy formation for overseas operations; 86 percent of ocean-going mine sweepers; 86 percent of cargo handling battalions vital to port management and loading operations in a combat theater; 85 percent of Military Sealift Command Military personnel; 68 percent of Navy Mobile Construction Battalions; the famed SEABEES; 66 percent of special boat forces; 34 percent of Naval Intelligence personnel; 35 percent of maritime anti-submarine warfare patrol squadrons; 30 percent of medical support personnel; 22 percent of ASW Helicopter Squadrons needed for fleet and convoy anti-submarine defense efforts; and 14 percent of our tactical sea-based aviation capabilities.

"The Marine Corps relies heavily on a fully trained and capable Reserve component to complement its active force. The Marine Corps Division/Wing team (the 4th Marine Division/Aircraft Wing Team) comprises one-fourth of our total Marine Corps combat structure and one-third of total Marine Corps manpower assets. The Reserves provide 40 percent of Marine tanks, 33 percent of heavy artillery, 30 percent of the light attack aircraft, and 33 percent of the anti-aircraft missile capability. It is not often realized how fully integrated our Navy and Marine Corps Reserves are becoming in our active force structure and peacetime operations. Naval Reserve C-9 Transport aircraft made many trips in support of our Marines ashore in Beirut during 1983 and 1984 and provided direct support to our operations in Grenada during the same period.

"As another example, the Ready Reserve provided 349 volunteers for three-week tours of duty aboard the battleship NEW JERSEY during its 11-month deployment, enabling most of the crew to rotate home for leave.

"A most successful new initiative begun in 1983 was the Sea/Air Mariner Program that now provides 10,000 first-term enlistments per year directly into the Naval Reserve. We are beginning a similar program this year for junior officer accessions directly into the Reserves in both the Navy and the Marine Corps."

Secretary of Defense Caspar W. Weinberger in his Annual Report to Congress Fiscal Year 1985 echoed the sentiments of Secretary Lehman when he stated:

"Under the Total Force Policy, the Reserve Components have assumed an increasingly important role in our conventional defense strategy. The creation last year of the position of Assistant Secretary of Defense for Reserve Affairs recognizes the critical role that Reserve Component forces would play in any conventional conflict.

"During the past four years, we have operated significantly the combat capabilities of the Reserve Components of all four Services. We have, for example, improved the equipment, training, and manning of Army and Marine Corps reserve units. Following the "first to fight, first to be equipped" policy, early deploying Army National Guard and Reserve units are receiving modern weapons systems before later-deploying active duty units. In FY 1985, these units are scheduled to receive more than 10,000 new items of equipment costing about $1.4 billion -- including 180 M1 tanks, 84 BFVs, and 8,000 modern support vehicles. New Marine Corps equipment includes KC-130T tanker aircraft and M198 howitzers. Guard and Reserve units are also benefiting from the more rigorous training afforded by increased participation in realistic field exercises.

"Under the Total Force Policy, the Naval Reserve is continuing its most ambitious expansion since World War II. The Navy's reserve structure is being simultaneously enlarged and modernized, to meet the needs of a

600-ship fleet and to strengthen the contribution of Reserve forces across the entire spectrum of warfare. Overall, the end strength of drilling Reserve units will have grown by 30 percent by FY 1989, and their equipment inventories will have been substantially upgraded. Naval Reserve pilots are now flying the F-14 and the F-4s, and are training in the F/A-18. By the end of FY 1985, we will have transferred 11 modern FF-1052 and FFG-7 frigates to the Naval Reserve Force (NRF), leading to a total of 26 Reserve frigates by the end of the decade. Based aboard these ships will be the SH-2F anti-submarine helicopters of the three Reserve squadrons now being formed. We will depend on the NRF to man almost all of our new MCM-1 and MSH-1 mine countermeasure ships, now under construction. In addition, we are modernizing our 13 Reserve squadrons of P-3 maritime patrol aircraft. By FY 1989, we will have completed upgrades to the AN/AQA-7 acoustic processor systems aboard the older P-3 "A" and "B" models now operated by the Reserves. As a preliminary step in the eventual transition of the Reserves to the modern P-3C aircraft, we have established our first Master Augmentation Unit with two P-3C aircraft. Two more such units are planned in FY 1987-88.

"The combat capability of our Reserve fighter forces (Air National and and Air Force Reserve) has also continued to improve. We have transferred highly capable F-16 aircraft to Reserve units, and are replacing early model F-4C/Ds with the more capable "E" version of the aircraft. And in FY 1986, we will introduce F-15 air superiority fighters into the Reserve inventory.

"In addition to deploying more modern systems with our Reserve forces, we are upgrading the combat capabilities of the aircraft. Enhancements include the equipping of fighters with advanced AIM-9L air-to-air missiles and with low-smoke engines and improved radar-warning receivers. The forces are receiving modern air-to-air and air-to-ground munitions, along with the advanced training needed to employ these weapons effectively.

"Reserve Forces also are being modernized through the transfer of long-range C-141 transport aircraft to the Air Force Reserve and Air National Guard. These transfers expand upon the successful Associate Reserve Program, under which Active and Reserve units are collocated. Modernization of shorter range airlift forces continues as new C-130 aircraft are brought into the air reserve inventory. This force expansion

The continued reliance on Reserve Forces is reflected in the preceding statements. The Naval Reserve Association fully supports SECDEF, SECNAV and CNO in their efforts to modernize the Naval Reserve.

The current budget request contains some $1.4 billion for Reserve equipment. Traditionally, the Naval Reserve has been allocated a small part of this appropriation and has depended on Congressional budget amendments and other funding adjustments to meet minimal modernization goals. A case in point is last year's Department of the Navy procurement program for Reserve Components (including the 4th Marine Aircraft Wing) which totaled $101.0 million including $33.0 million for C-9B procurement. Congress added $68 million for F-14 modernization, $7.5 million for AQA-7 Display Update and $12.0 million for H-60 helicopters. These and other Congressional additions contributed significantly to the readiness of the Naval Reserve.

The Naval Reserve Association will address the following issues:

- o Anti-Submarine Warfare
  - P-3C Procurement
  - P-3A/B Signal Processing Improvement
  - LAMPS I to Support NRF Ships and Coast Guard Cutters
  - TACTAS for NRF Frigates
- o Towed-Array ASW System Trainer
- o Mine Warfare
- o Reserve Tactical Air Wings
- o HAL/HC Squadrons
- o Reserve Naval Construction Force (Seabees)
- o ARAPAHO
- o Naval Reserve Strength
- o Deputy Chief of Naval Operations (Naval Reserve)
- o Expanded Recall Authority

ANTI-SUBMARINE WARFARE

That the Soviet submarine threat grows increasingly menacing is a grim fact of life that all defense planners recognize.

Secretary Weinberger in this year's Annual Report to Congress stated:

With respect to the Soviet submarine force,

> "Particularly worrisome have been the advances in the Soviet submarine fleet. This massive underseas combat force -- at more than 370 boats, by far the world's largest -- has improved greatly in quality over the past decade and a half. The 1970s saw the introduction of several new submarine types, including the nuclear-powered Alfa and Victor III and the diesel-electric Tango. Classes introduced during the 1980s have yielded substantial additional improvements across the full range of submarine capabilities. For example, the (Russian) 13,000-ton Oscar, armed with 24 SS-N-19 long-range anti-ship missiles, has significantly increased the scope and magnitude of the threat to our carrier battle groups and other surface forces. Still other new classes now being delivered to the fleet, such as the 9,700-ton Mike and the 7,300-ton Sierra, can be expected to yield further improvements in Soviet submarine capabilities in future years. These include increases in size, which provide more space for weapons, and enhancements in speed and sound quieting, which make the submarine more difficult to detect and engage."

Secretary of the Navy John F. Lehman, Jr. in his Fiscal Year 1986 Military Posture statement eloquently expressed his concern over the Soviet submarine threat when he stated:

> "The Soviets are demonstrating every day at sea that we no longer have a passive defensive strategy available to us on the world's oceans. Unlike World War II, we do not have a merchant marine able to sustain losses in a submarine war of attrition. The Soviets today have more than 270 attach submarines, while Hitler very nearly won the Second World War in 1942 with about 60 submarines operational during most of the year.

"The Soviet submarine threat is of particular concern and 1983 and 1984 saw major developments. Not only did we have two incidents of Soviet nuclear attack submarines actually hitting or inadvertently fouling our surface combatants, but we have now seen a developing pattern of regular deployments of nuclear attack submarines close off our principal naval ports. These Soviet nuclear submarines today have made great strides in quieting and overall capability in sensors and weapons. They currently are building three new classes of nuclear attack submarines, the SIERRA, MIKE, and AKULA, and one new class of diesel attack submarine, the KILO. They are building two distinct classes of ballistic missile submarines, the TYPHOON and DELTA IV, and have at least one new submarine-launched ballistic missile program, the SS-NX-23.

"While the Soviets have had long-range cruise missiles capable of land attack deployed for more than 20 years, they deployed in 1984 for the first time a longer-range submarine-launched cruise missile comparable to our TOMAHAWK. While this new nuclear capability does not add to the target coverage or overall threat already existing against U.S. targets in their SLBM force, it does complicate our ability to ensure warning time for attack against our bomber bases. For the last five years the Soviets have averaged a production rate for all submarines of about 10 per year. This rate is expected to continue for the next four years at least."

The following statements of Secretary Weinberger contained in his FY 86 posture further stress the vital role that long-range maritime patrol aircraft must play in neutralizing this Sovie threat:

With respect to our ASW Programs,

"Countering the Soviet submarine threat requires a layered offensive strategy that both maximizes enemy attrition and affords a high level of protection for our naval forces. The best means of neutralizing enemy submarines is to engage them in forward areas and barriers -- before they come within range of attacking our forces. For this, we rely primarily on attack submarines and long-range P-3 patrol aircraft supported by undersea surveillance systems. Enemy submarines that escape forward sweeps and penetrate our ASW barriers must contend with a layered defensive screen surrounding our naval task forces and convoys. Within this layered defense system, long-range protection is provided by land- and carrier-based patrol aircraft and by attack submarines operating in a direct-support role. At shorter ranges, protection is provided by information of surface combatants equipped with passive and active sonar systems and by torpedo-armed anti-submarine helicopters."

With respect to the P-3 MPA program,

"P-3 maritime patrol aircraft, when provided information from broad-area surveillance systems on the general location of Soviet submarines, offer our most potent area anti-submarine capability. Fleet exercises have also demonstrated the aircraft's utility as long-range protection forces for carrier battle groups and other naval task forces. Several characteristics of the P-3 system contribute to these capabilities. The aircraft's long-range and high endurance enable it to cover large ocean areas. Its large number of sonobuoys and advanced data-processing systems help pinpoint the location of enemy submarines. And its large payload of ASW torpedoes provides the capability to translate submarine detections into submarine kills.

"The FY 1986-90 program continues production of the latest model in the P-3 series, the P-3C. A total of 250 of a planned force of 316 of these aircraft have been authorized through FY 1985. The five-year program adds 42 more -- all in the Update III configuration -- including nine in FY 1986. To promote program stability and to achieve cost savings, we are requesting funds to start a multi-year procurement program for the 33 aircraft scheduled for authorization during FY 1987-90. Beyond the procurement of new aircraft with improved performance features, we are retrofitting Update III avionics into earlier versions of the P-3C. For the future, we are developing an Update IV version of the P-3C with expanded processing capabilities and a new family of acoustic sensors designed to counter the quieting trend in the Soviet submarine force."

RESERVE MARITIME PATROL (VP) SQUADRONS

The Maritime Patrol Force consists of 37 squadrons each containing nine (9) P-3 aircraft. Twenty-four (24) of these squadrons are active Navy and thirteen (13) are reserve.

The active Navy squadrons are equipped with P-3B and P-3C aircraft ranging in configuration from the most current production model, the P-3C Update Three, to the early non-updated P-3C and last-production P-3Bs.

The Reserve VP squadrons are equipped with the early P-3A and P-3B aircraft. Reserve squadron location and aircraft type are depicted below:

Squadron	Location	FY 86	Note
VP-60	Glenview, IL	P-3B	P-3C, FY 93
VP-90	Glenview, IL	P-3A	P-3B, FY 92
VP-62	Jacksonville, FL	P-3B	P-3C, FY 92
VP-64	Willow Grove, PA	P-3A	
VP-66	Willow Grove, PA	P-3A	
VP-65	Pt. Mugu, CA	P-3B	
VP-67	Memphis, TN	P-3A	P-3B, FY 89
VP-68	NAF Wash, MD	P-3B	
VP-69	Whidbey Island, WA	P-3A	
VP-91	Moffett, CA	P-3B	
VP-92	S. Weymouth, MA	P-3B	P-3C, FY 91
VP-93	Detroit, MI	P-3B	
VP-94	New Orleans, LA	P-3B	

The Reserve VP community represents 35% of the Naval Maritime Patrol Squadrons. Today the most critical issue facing our Maritime Patrol Squadrons is the block obsolescence of the early P-3A and lightweight P-3Bs. These two models represent 43% of our total aircraft and almost 100% of our Reserve Force aircraft. In the early to mid-60s the Navy bought the P-3A and P-3B aircraft at a high rate to replace their force of obsolete SP-2H Neptune aircraft. The aircraft delivered in the 1964-68 time-frame will reach the end of their 28 year fatigue life between 1992 and 1996.

The problem this mass obsolescence causes in terms of force loss and required budgetary outlays has been widely recognized.

During the FY 85 hearings, VADM Schoultz, the then Deputy Chief of Naval Operations (Air Warfare) was asked:

> "What production rate starting in FY 85 would be required so that aircraft could be transferred from the active force to the reserve force to replace the P-3As and lightweight P-3Bs as they reach the end of their service life without incurring a reduction in either the active or reserve force levels?"

> Admiral Schoultz: "The P-3C procurement rate necessary to provide reserves with sufficient aircraft to replace the aging P-3As and P-3Bs is 22 per year."

In the SASC report 98-500 dated May 31- 1985, the committee stated:

"The Administration requested funds in Fiscal Year 1985 for continued procurement of P-3Cs, SH-60Bs, and SH-2Fs. Funds were also requested for research and development for the S-3B Weapon System Improvement Program and the CV ASW Helicopter, as well as procurement and RDT&E for various other Air ASW programs including processors, torpedoes, sonobuoys and other support equipment.

"The committee approved most of the authorization, but made reductions in funding levels for the P-3C, while retaining the requested nine aircraft. The committee increased the procurement for the SH-60B and funded the SH-2F procurement for the Naval Reserve.

"With regard to P-3C aircraft, the committee understands that the number of P-3Cs required to be procured annually to maintain the Navy's long-range Maritime Patrol Force structure at its present mix of 24 active and 13 reserve squadrons is much higher than requested. Moreover, the committee notes that without a significant increase in P-3C procurement in the future, the Maritime Patrol Force structure will suffer a severe decline in the 1992-1995 time-frame as about 200 older model P-3A/B aircraft in the active and reserve squadrons reach the end of their 28-year service life.

"The committee is concerned, however, about the Navy's intentions for maintaining and modernizing its active and reserve Maritime Patrol Squadrons. There has been conflicting testimony before Congress about the number of P-3Cs needed to be procured annually, and there have been conflicting studies about Maritime Patrol Force structure requirements. Internal budget deliberations on P-3C procurement have resulted in almost constantly changing annual procurement projections.

"With regard to the SH-60B LAMPS MK-III, the committee is also concerned that the annual procurement, as requested, was below that which is economically sensible, and that the total program requested by the Department may be insufficient to procure the number of helicopters needed to fulfill the surface combatant based air ASW mission.

"Much the same is true for the SH-2F LAMPS MK-I. Questions remain as to how many SH-2F should be procured, and what the mix should be between active and reserve squadrons. Moreover, the direction the program seems to be taking is far from consistent.

"The Navy's Maritime Patrol community is also a prime example of the success of the Total Force policy. In Air ASW, it stands as a clear success story to be emulated by the rest of the Navy. Naval reservists are well integrated into the operations of the active squadrons and make a major contribution to our Navy's abilities to accomplish the long-range ASW patrol mission. Naval reservists flying older P-3A/B aircraft perform their missions well, considering the limitations of the aircraft which they fly, and the committee has supported limited modernization of these platforms to maintain their effectiveness. Last year, for example, the committee authorized TAC/NAVMOD kits for this purpose. The committee believes that this success should be extended to all Air ASW forces, as well.

"Consequently, the Secretary of the Navy is requested to furnish the committee, in conjunction with submission of the Fiscal Year 1986 Defense Budget Request, a comprehensive master plan for modernization and maintenance of the Navy's Air ASW forces, both in the active and reserve components. Such a master plan should include a procurement plan for aircraft needed to satisfy the requirements of both the active and reserve forces, along with a schedule for any service life extension program (SLEP) where appropriate and a modernization plan for those aircraft not being replaced through new procurement. Any planned or contemplated changes in the active and Reserve Maritime Patrol Squadron Force structure should be addressed, along with Navy intentions regarding development of successor aircraft, where applicable. This plan should be comprehensive in that it should also address procurement levels of major supporting weapons and expendable sensors to include torpedoes and sonobuoys."

To date the report has not yet been submitted and since the report itself has been classified, the Naval Reserve Association will never learn its specific content. However, the plentiful supply of unclassified information available has enabled the NRA to conduct its own analysis of current MPA force level aircraft and out-year projections.

The MPA Total Force requirement is for 460 aircraft as shown in Figure 1. Through the FY 85 Defense Bill, 251 P-3C have been authorized of which 235 have been delivered through the end of 1984. Assuming that the 41 P-3B heavyweight aircraft can be economically modified and their service life extended for another 10 to 12 years; and the 12 P-3C to be diverted to the electronic warfare mission are replaced; we still must buy 180 P-3 aircraft to meet our current force requirements.

The NRA has taken the total force requirement as shown in Figure 1, and the current inventory of both the Active and Reserve force and has projected the force composition by year through the year 2000, based on assumed production rate of nine aircraft per year. Our analysis took into account estimated normal peacetime attrition losses; the planned diversion of 12 P-3C aircraft to meet the critical needs of the electronic warfare EP-3 aircraft program; and the use of the older but still usable P-3As to be converted to TP-3A pilot training aircraft for the two training squadrons which would temporarily free up 12 P-3C aircraft. We also assumed for the analysis a service life extension program (SLEP) for the 41 heavyweight P-3Bs, a matter which is currently under study by the Navy. The results of our analysis (Figure 2) shows a decline in the reserve force structure in 1994. To more clearly show the impact we have illustrated that same shortfall on a squadron basis in Figure 3. As can be seen, we will no longer have sufficient aircraft for outfitting five squadrons in 1994, and in 1995 we lose still another squadron. I would point out that from now through the year 2000, based on a nine a year production rate, the MPA force will have essentially no aircraft in the backup (pipeline) category which is cause for alarm if conflicts at sea develop. The NRA wishes to highlight this particular aspect of the production program for two reasons; first to show that it introduces risk in the ability of the Reserves to meet their operational commitments in a wartime scenario, and secondly, to show that even though every available asset is going to the squadrons, there will still be a significant shortfall which will result in the loss of reserve squadrons.

Recommendation

The NRA strongly recommends increasing P-3C production to 12 aircraft per year and to place the FY 87-90 procurement under a multi-year contract to achieve the 12 to 15% cost savings as proposed by the contractor for such a program. Increasing the buy from 9 to 12 aircraft per year will substantially reduce the shortfall as shown on Figure 4 and the resultant impact on squadron strength (Figure 5). We fully recognize that realistic budgetary constraints make the true need of 20-22 aircraft per year impractical at this time, but the 12 per year rate, in our opinion, is not only fiscally responsible but is affordable. We recommend an increase of $100-105 million dollars to the FY 86 budget to procure three additional P-3 aircraft, and request that they be assigned to our Naval Air Reserve force in order to achieve horizontal integration into our reserve force concurrent with the active force.

Even this acquisition profile will not provide an all P-3C force in reserve MPA squadrons until after the year 2000. Hence an equally important issue, that is the modernization/SLEP program for the P-3A/B aircraft must also be addressed now. This update and modernization effort must not only include the basic airframe and engine, but also must address the avionic update necessary to insure effectiveness against the Soviet submarine threat of the 90s and provide a measure of compatibility and reasonable interface with upgraded fleet detection systems.

More detail about this initiative is provided in the P-3A/B AQA-7 Display Update section which follows:

U.S. NAVY
MARITIME PATROL AIRCRAFT
TOTAL FORCE REQUIREMENTS

	REQUIRED AIRCRAFT				
1. PRIMARY AIRCRAFT AUTHORIZED (PAA)	ACTIVE		RESERVE		TOTAL
24 SQUADRONS AT 9 A/C PER SQDN	216		–		216
13 SQUADRONS AT 9 A/C PER SQDN	–		117		117
2 ACTIVE FLEET REPLACEMENT SQDNS	40		0		40
3 RESERVE MASTER AUGMENTATION UNITS			9		9
RDT&E AIRCRAFT	17		0		17
TOTAL (PAA)	273	+	126	=	399
2. BACK-UP AIRCRAFT AUTHORIZED (BAA)					
ACTIVE	22				22
RESERVE			17		17
TOTAL AIRCRAFT AUTHORIZED	296	+	143	=	438
3. FORCE ASSURANCE AIRCRAFT	22		–		22
TOTAL AIRCRAFT REQUIRED	317	+	143	=	460

FIGURE 1

MPA FORCE LEVEL PROJECTION

PROCUREMENT RATE: 9 A/C PER YEAR

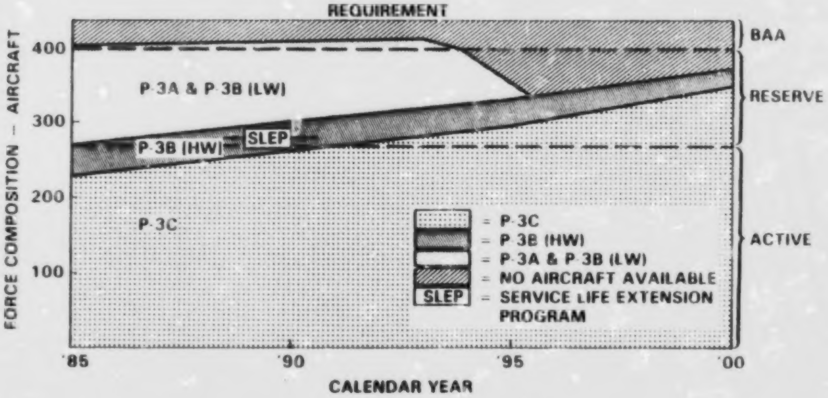


FIGURE 2

190

MPA PROJECTED SQUADRON COMPOSITION

PROCUREMENT RATE: 9 A/C PER YEAR

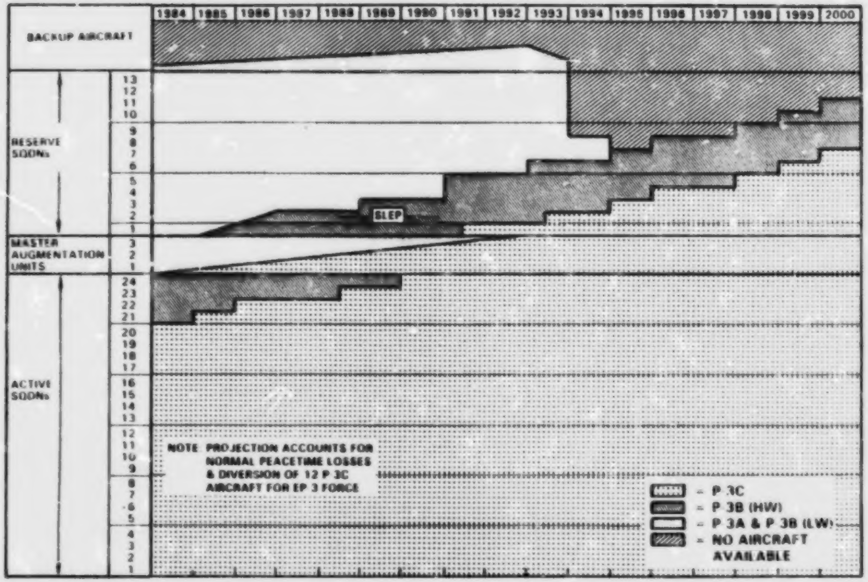


FIGURE 3

MPA FORCE LEVEL PROJECTIONS

PROCUREMENT RATE: 12 A/C PER YEAR

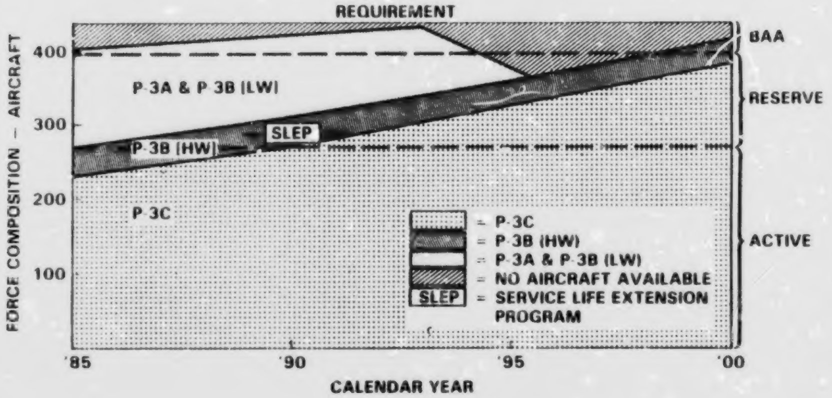
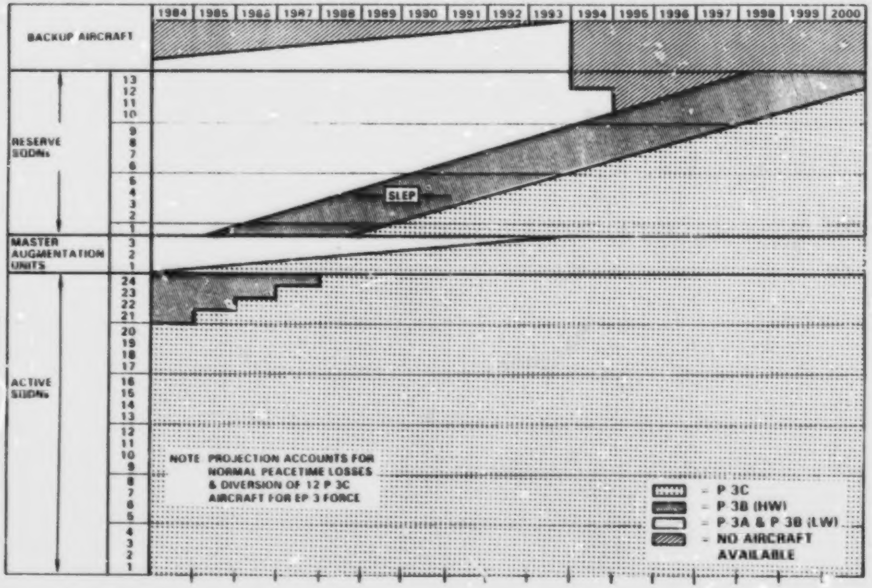


FIGURE 4

MPA PROJECTED SQUADRON COMPOSITION

PROCUREMENT RATE: 12 A/C PER YEAR



NOTE PROJECTION ACCOUNTS FOR NORMAL PEACETIME LOSSES & DIVERSION OF 12 P 3C AIRCRAFT FOR EP 3 FORCE

FIGURE 5

P-3A/B AQA-7 (V10-12) UPDATE

The previous section developed the rationale supporting a 12 P-3C per year acquisition plan in order to partially alleviate the block obsolescence of the Reserve VP Force in the 90s. As has been previously demonstrated, twenty (20+) plus P-3C procurement per year is required to achieve an all P-3C force and avoid all service life extension programs (SLEP) for the current P-3A/B aircraft.

Since the fiscal realities indicate such a procurement profile is not feasible, the Naval Reserve Association proposes a service life extension and acoustic modernization program designed for Reserve P-3A/B aircraft which will enable:

o Reserve Force levels to be maintained in the 90s.

o Reserve P-3A/B aircraft to meet the Soviet submarine threat expected in that decade.

o Reserve P-3A/B aircraft to maintain an interoperability and common acoustic display format with update fleet P-3 aircraft.

The P-3A/B aircraft in the Reserve VP squadrons are undergoing their final scheduled avionic upgrading with the installation of the TAC/NAVMOD and improvement of the baseline AQA-7 (V1-2) acoustic processor to the AQA-7 (V10-12) model. These modifications were introduced in the fleet in the 70s in the case of the TAC/NAVMOD and the early 80s for the AQA-7 (V10-12) in order to meet the threat of the then new Soviet submarine technology. NO FURTHER P-3A/B AVIONIC IMPROVEMENT IS PLANNED.

The Naval Reserve Association has recognized this serious operational shortfall in those P-3A/B aircraft destined to be assigned to the Reserve P-3 squadrons throughout the 90s and in some cases beyond the year 2000. Consequently, in the FY 85 budget deliberations the NRA supported a Congressional initiative that provided $7.5 million for the development of an updated display for the AQA-7 (V10-12) acoustic processor.

House of Representatives Report 98-1086 contained the following language relative to this initiative:

> "AQA-7
>
> Improvement Program for Naval Reserve P-3 Aircraft
>
> There are approximately 135 P-3A and P-3B aircraft in the Naval Reserve that have the AN/AQA-7 equipment to process the acoustic signals of submarine targets. In order that the Naval Reserve adequately counter the latest Soviet threat and that expected in the early 1990's, and also achieve horizontal integration between the active and reserve components of the Navy, the Committee believes that the AQA-7 processing system must have an improved display system incorporated. Consequently, the Committee

> directs that the Department procure five service test models of the improved AQA-7 display system in order to test and evaluate this system to determine fleet operability and suitability. A report on the results of this evaluation is to be submitted to the Committee no later than June 1, 1985. The Committee considered making a significant number of line item reductions in the modification account, but decided against that action in order to leave sufficient funds to execute this directive and to determine whether this could be a cost effective modification to our maritime patrol aircraft."

The AQA-7 Display Update Kit extends the improved operator interface by providing a modern, high resolution, quick reaction monochromatic CRT display subsystem. In addition to presenting twice the amount of real-time acoustic data currently available to the AQA-7 operator, the Display Update Kit provides computer-assisted target classification by incorporating into the AQA-7 the Passive Acoustic Detection and Classification (PADC) algorithms which are currently operational on board the Active Duty Fleet aircraft. Another benefit to the Reserve operator is the preservation of the hard-copy acoustic display on the AQA-7 chart recorder. Hard copy provides the experienced operator with an additional display dimension which is invaluable during mission and post-mission analysis. Because the Reserve acoustic operators will have standard display formats of acoustic data identical to their counterparts in the Active P-3C aircraft, 1) Fleet/Reserve interoperability aboard aircraft and debrief sites will be enhanced, and 2) crewmen from the fleet joining the Reserve P-3 units will have compatible equipment with which to work, thereby decreasing the amount of retrogressive training required.

In order to fully exploit the capabilities inherent in the AQA-7 Display Update Kit funded in FY 85 and to provide the enhanced acoustic processing capability necessary to meet Soviet submarine technology of the 90s, the AQA-7 system requires further signal processing enhancement.

The Naval Reserve Association proposes the procurement in FY 86 of five (5) Service Test Model Processing Enhancement Kits for the AQA-7 acoustic processor.

The AQA-7 Processing Enhancement Kit provides a quantum step in ASW acoustic capability for the Reserve P-3 aircraft in the areas of signal processing, post-processing/operator aids, system availability, and growth potential. The enhanced AQA-7 signal processing is shown in Table 1. It is important to note that the AQA-7 has been designed for mixed-mode processing; and this capability is expanded with the Processing Enhancement Kit. For example, a concurrent AQA-7 processing arrangement could be eight (8) LOFAR, eight (8) DIFAR, two (2) DICASS, and one (1) ERAPS. An additional improvement to the DICASS mode is extended doppler processing to accommodate the high-speed threat.

The AQA-7 system availability, a major component in Reserve ASW mission success, is nearly doubled with the incorporation of the Processing Enhancement Kit. With the addition of two (2) independent processing paths which provides a total of four (4), at least three-fourths of the system remains operational even with a major failure within a processing unit. Incorporation of new technologies for signal processing also doubles the system reliability, when compared to the AQA-7 3V system, which further improves system availability.

The AQA-7 Processing Enhancement Kit is designed to minimize its life cycle costs. Ground rules, such as retaining the AQA-7 footprint and building upon existing capability, minimize not only acquisition cost but also aircraft installation cost. Figure 1 depicts the P-3A/B aircraft installation of the AQA-7 Processing Enhancement Kit which provides an estimated 36 watt power savings and a minimal 26 lb. weight increase. Since the Kit will accommodate both the AN/ARR-72 and AN/ARR-78 Receivers, the Naval Reserve has the option to use either receiver or a combination of the two to supply the AQA-7 with 32 processing input channels. The recurring cost of the AQA-7 Processing Enhancement Kit is relatively inexpensive as compared to the capability gained and is estimated to be $0.33 million per shipset in FY 1986 funds. The common module theme minimizes impact on the established AQA-7 logistic network and, along with the significant reliability improvement, minimizes maintenance cost.

Five (5) STMs are needed for Operational Test and Evaluation (OT&E) by OPTEVFOR. The schedule shown in Figure 2 could be pursued and, following a successful OT&E, the procurement of production sets could commence in FY 1989 and could be incorporated in Reserve P-3A/B aircraft commencing in FY 1990. Completion of this modification would significantly enhance the capability of the Reserve P-3A/B aircraft. A P-3A/B with the TAC/NAVMOD and the AQA-7 Processing Enhancement System would provide the Navy and the United States with a very capable counter to the Soviet submarine menace.

The Reserve P-3A/B acoustic modernization program as outlined above, including the Display Update funded in FY 85 and Signal Processing Enhancement requested in FY 86 will provide the improved ASW detection capability necessary for the Reserve VP squadrons in the 90s while offering a low-cost modernization alternative until an all P-3C force can be achieved. (See table below -- FY 1986 Dollars in millions.)

	Display Update	Signal Processor Enhancement
R&D	7.5*	10.5
Production Per Ship Set	0.35	0.33

*Funded in FY 86

It is essential in the view of the Naval Reserve Association that signal processing R&D funding of $10.5 million be provided in FY 86. The development and testing lead-time necessary to be able to make production decisions in FY 89-90 require FY 86 start-up of the R&D effort.

THIS INITIATIVE, IF SUCCESSFUL, OFFERS GREAT PROMISE IN THAT FOR THE COST OF TWO (2) NEW P-3C AIRCRAFT, MORE THAN ONE HUNDRED (100) P-3A/B RESERVE AIRCRAFT CAN BE SIGNIFICANTLY UPGRADED.

Every mariner is taught from day one to recognize the proximate danger inherent in a "constant bearing, decreasing range" situation. The block obsolescence of the Reserve MPA force is such a situation. For several years now, the Naval Reserve Association has sounded the alarm. We urge that a rational, realistic plan be implemented this year to solve this critical problem. The capability of the MPA force and the threat they counter deserve better than "crises management" executed when "in extremis".

Recommendation

The Naval Reserve Association strongly recommends the Congress to authorize and fund the procurement of five (5) Service Test Models of the AQA-7 Processing Enhancement Kit, including contractor environmental and reliability testing at a cost of $10.5 million in FY 1986.

TABLE 1

AQA-7 PROCESSING ENHANCEMENT KIT SIGNAL PROCESSING IMPROVEMENTS

Mode	Capability Improvement Over AQA-7 with Display Update	Maximum Channels Available per Shipset
LOFAR	Doubled	32
DIFAR	Doubled	16
Verniers	Doubled	96 (Verniers)
DICASS	Quadrupled	4 (w/Extended Doppler)
DICASS Omni	Quadrupled	8 (w/Extended Doppler)
ERAPS	New Capability	2

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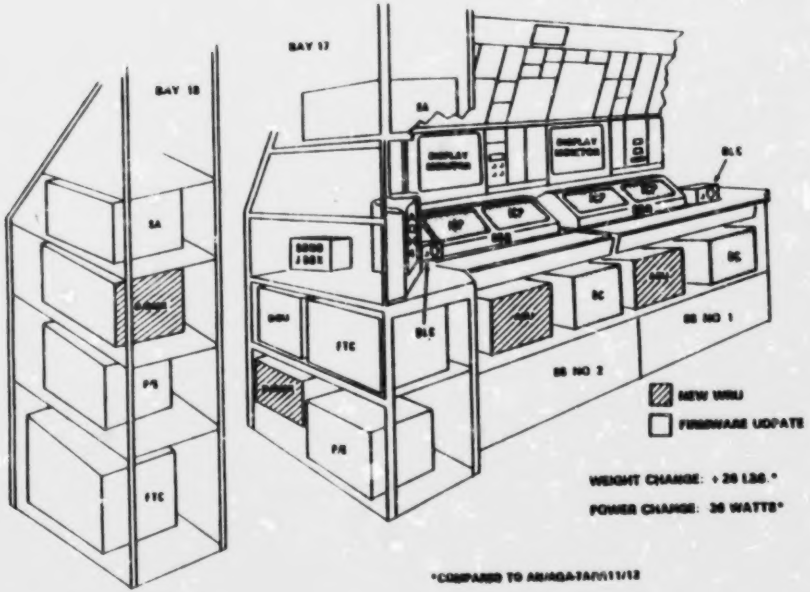
Figure 1. P-3A/B PROPOSED AIRCRAFT INSTALLATION FOR AQA-7 PROCESSING ENHANCEMENT KIT


BAY 18
BAY 17
SA
PS
FTC
SONO J BOX
DISPLAY MONITOR
DISPLAY MONITOR
BLC
DC
BB NO 1
BB NO 2
NEW WRU
FIRMWARE UPDATE

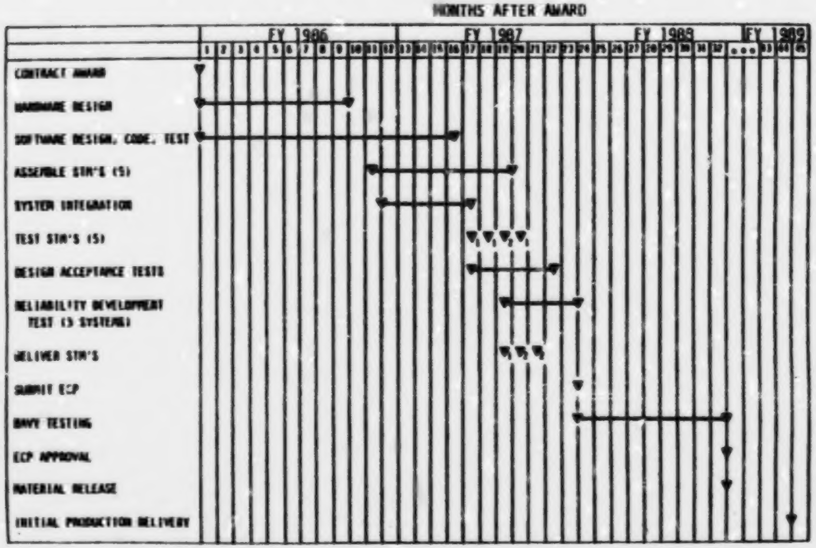
WEIGHT CHANGE: + 26 LBS.*

POWER CHANGE: 36 WATTS*

*COMPARED TO AN/AQA-7A(V)11/12

Figure 2. AQA-7 PROCESSING ENHANCEMENT KIT

STM SCHEDULE



LAMPS MK I HELICOPTERS

During the past year two Naval Reserve squadrons, HSL-84 at NAS North Island, CA and HSL-74 at NAS South Weymouth, MA began receiving the SH-2F LAMPS MK I helicopter. Next year, HSL-94 at NAS Willow Grove, PA will receive the first of their SH-2s. Current Navy plans call for each of these three (3) Reserve squadrons to initially be equipped with eight (8) LAMPS MK I helicopters.

The mission of these three (3) squadrons will be to provide LAMPS aircraft detachments for the frigates of Naval Reserve Forces, FF-1052s and FFG-7s, and during periods of mobilization to provide the same LAMPS capability for the Coast Guard WHEC cutters. These cutters have either just completed or are currently undergoing conversion which will make them fully compatible with the LAMPS MARK I system.

The Reserve frigates with their LAMPS helicopters will be an integral part of the U.S. Navy's total ASW capability. Operating equipment identical to that in the active force, this ASW system is a perfect example of Secretary Lehman's concept of "horizontal integration" of Active and Reserve Component Forces.

Last year the Naval Reserve Association proposed that Congress provide sufficient LAMPS MK I resources for all Active and Reserve frigates to have one embarked helicopter during peacetime. In addition, the NRA recommended that Congress provide the Naval Reserve Forces with enough LAMPS MK I helicopters to fill the decks of the Coast Guard WHECs and to provide a second LAMPS MK I for the eighteen (18) FFG-7s programmed for the Naval Reserve, and which are capable of embarking two (2) helicopters.

The NRA pointed out that when the cost of the frigates and their ASW equipment is considered, for less than a 3% increase in investment and operating costs, the Force Commander during wartime could realize a 30% to 50% increase in capability by having the second helicopter embarked.

The Congress generally endorsed the NRA round-out position for the second LAMPS helicopter. The Senate Armed Services Committee directed the Navy to submit, this year, a comprehensive study on total Active and Reserve ASW Forces. This study was to address among other things, the concept of a second LAMPS MK I on those ships capable of handling two. The Navy's FY 1986 budget provides for six (6) additional SH-2F helicopters to cover the additional frigates added last year to the Naval Reserve Force by the Secretary of the Navy and for additional attrition. However, even with this buy there will be insufficient LAMPS MK I assets to provide the second helicopter for the Reserve FFG-7s. (See table below.)

1995 LAMPS MK I Reserve Requirements*

Type of Ship	No. of Ships	No. of Embarkation Slots
FFG-7	18	36
FF-1052	8	8
WHEC	12	12
Total	38	56

*Assumes the 85% deployment estimate for ships offsets the 17% requirement for pipeline aircraft.

The Navy has stated that there will be sufficient SH-2F assets available in 1995 to fulfill all active Navy requirements and to provide the Reserves with only one (1) LAMPS MK I per ship. Although no advanced procurement for the SH-2F has been included in the FY 1986 budget submission, the NRA understands that the Navy's current plans are to consider the procurement of six (6) additional SH-2F helicopters in 1987 to permit the Reserves to embark two (2) LAMPS MK I's on their FFG-7s. The Navy is now also planning to pursue this concept in the active force with the LAMPS MK III.

The Naval Reserve Association believes it would be most useful for the Congress to provide additional impetus to the Navy's current planning to enhance Naval Reserve ASW capability.

Recommendation

The NRA recommends the Congress allocate $4.5 million of the $69.9 million requested in FY 1986 for SH-2 procurement toward advanced procurement for six (6) aircraft in FY 1987 with instructions that this be the first year of a three-year buy of the eighteen (18) aircraft needed to provide the full round-out capability to the Naval Reserve Forces.

TOWED-ARRAY FOR THE NAVAL RESERVE FRIGATES

One of the most critical aspects of our maritime strategy is our ability to project and sustain the full range of combat and support forces. Current planning requires the movement of 95 percent of the dry cargo and 99 percent of the fuel by sea.

In the face of this massive sealift requirement, it is well to remember that this effort will be opposed by some 300 Soviet submarines of substantial capability and endurance. Germany, with but 50 attack submarines, was able to sink during 1942 alone some 1,664 allied ships. Our available inventory of merchant ships today, including the National Defense Reserve Fleet, cannot absorb that attrition and carry out its mission.

The prime mission of the Naval Reserve Force is ASW Maritime Escort. The introduction of the FFG-7 and FF-1052 frigates has provided the Reserve Surface Force with a modern state of the art weapons system to accomplish this tasking. The number of convoy escort ships available even when including those provided by our NATO allies, totals about 60-65 escorts. Since the available ships fall short of the requirements (Congressional Budget Office estimates the U.S. Navy shortfall at approximately 100 ships), the Naval Reserve Association believes highest priority must be given to maximizing existing ship capability. This includes providing Reserve Force frigates with both Towed-Array Sonar and a full complement of two (2) SH-2 LAMPS I helicopters. The SH-2 LAMPS helicopter issue has been discussed in another section.

Secretary of Defense Weinberger in this year's Annual Report to Congress addresses the Towed-Array issue as follows:

> "Tactical Towed-Array Sonar (TACTAS)
>
> The long-range detection capabilities of TACTAS will substantially enhance the ASW capability of our surface combatants, providing an essential counter to the increased range of weapons carried by Soviet submarines. The AN/SQR-18 towed-array sonar system is being deployed aboard all 46 of the FF-1052 frigates operated by active and reserve units, and aboard all of the Naval Reserve's FFG-7 frigates. The AN/SQR-19, a more advanced towed-array sonar system now in the final stages of development, will be installed later in the decade on DD-963, DDG-993, and DDG-51 destroyers and on CG-7 cruisers and active FFG-7 frigates. We are introducing improvements to both systems to maintain their detection capabilities against Soviet submarines."

The Naval Reserve has learned that in accordance with the Fleet Modernization Program (FMP) all Reserve frigates will be equipped with Towed-Array Sonar by 1988.

The funding profile to accomplish this goal is as follows:

	FY 1984 Actual Funding	FY 1985 Planned Funding	FY 1986 Proposed Funding	FY 1987 Proposed for Authorization
TACTAS Procurement:				
Quantity	12	10	16	19
$ Millions	116.7	112.0	165.4	184.0

Recommendation

NRA fully supports this program which will permit for the first time the NRF frigates to perform the mission for which they were built.

TOWED-ARRAY ASW SYSTEM TRAINER

Current Navy plans call for the transfer of twenty-six (26) of a mix of FF-1052 and FFG-7s to the Naval Reserve Force. These ships, which are part of the "LOW" component of the Navy's "HI/LOW" mix of fast ocean escorts, are equipped with LAMPS MK I (which includes the SH-2F helicopter and the SQR-17A shipboard processor), the AN/SQR-18A tactical towed array (TACTAS), and a hull-mounted sonar (SQS-26CX in FF-1052 and SQS-56 in FFG-7 classes).

The array of sensor sub-systems on these ships, when operated by adequately trained crews, will provide an effective shield for high-value targets and convoys. The key is the capability of the crew. ASW sensor operator training has traditionally been difficult to attain. Effective interaction between the ASW sensor operators and the combat command team is critically important, and a high competence level can only be achieved through repetitive practice sessions during many ASW events. Unfortunately, such events during peacetime operations are infrequent and unpredictable. These realities make it particularly difficult for reserve crews to attain desired readiness levels. Additionally, long transit times to the OP area further compress reserve crew training time.

Fleet studies have addressed this problem by recommending increased use of pierside trainers and development of an onboard training capability for ASW/SONAR operators. NRA understands that such an on-board training system in being planned for ships with MK III LAMPS and/or AEGIS.

An adjunct to the SQR-17A shipboard processor has been developed that will allow the entire ASW crew of LAMPS MK I fast, ocean-escort ships to be exercised using realistic, computer-generated target signals. The system has been designed as an addition to the SQR-17A such that it can be provided by way of an approved engineering change proposal. Such a training system would be extremely useful to the Naval Reserve crews of FF-1052 and FFG-7 class ships now reaching the Reserve Forces, solving the problem of how to practice a wartime mission during peacetime.

The Naval Reserve Association believes that the on-board ASW simulator should be retrofitted into FF-1052/FFG-7 ASW ships assigned to the Naval Reserve Force as soon as possible.

The installations will require $3 million of non-recruiting cost and $300K per unit in production. The design of the unit facilitates incorporation into the SQR-17A, thus making the acquisition fast and relatively simple. This equipment will result in a greater depth of training for Naval Reserve operators of the ASW combat team.

Recommendation

The Naval Reserve Association recommends that the Congress appropriate $6.8 million in the current fiscal year to fund this engineering change of the AN/SQR-17A system. The funds would be used to manufacture three (3) on-board simulators for evaluation to determine suitability for use on-board ships of the FF-1052/FFG-7 class in the Naval Reserve. Assuming favorable results, the NRA will recommend expenditure of additional funds in appropriate fiscal years to retrofit all twenty-six (26) of the ASW-capable fast-ocean escort ships as they transfer to the Naval Reserve Force.

MINE WARFARE CRAFT OF OPPORTUNITY (COOP) PROGRAM

The Mine Warfare Craft of Opportunity (COOP) Program currently being implemented, affords the Naval Reserve an excellent, exciting and challenging program to augment the limited active and Naval Reserve Force (NRF) mine countermeasures (MCM) forces. This new program will assign the NRF responsibility for accomplishing critical peacetime Q-Route Survey requirements and vital wartime MCM operations in military and strategically important commercial ports where no other MCM forces are available. It represents a low-cost way to augment MCM forces in response to Chief of Naval Operations (CNO) direction to find ways to reduce the mine threat to CONUS without incurring cost to build additional MCM ships.

The twenty-two (22) vessels used as COOP trainers will consist of ten (10) Naval Academy Yard Patrol (YP) craft (if conversion/overhaul costs are within funding constraints) and twelve (12) fishing vessels (primarily stern trawlers). Acquisition of fishing vessels by lease or lease to purchase agreements has been authorized in view of the excessive costs required to overhaul confiscated vessels. This will also improve craft quality and simplify support and training requirements.

Equipment programmed for COOP will consist of GFE and off-the-shelf components to provide a near-term (FY 85-87) capability to conduct route survey/minehunting operations with a side scan sonar (C MK 1 Shadowgraph) in conjunction with other navigation and sensing and integration components. Mid-term improvements include adding a Remotely Operated Vehicle (ROV) for contact identification and neutralization, an aheadlooking sonar (AN/SQQ-14 small boat

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version) and a trawl sweep capability that is currently undergoing development and test and appears extremely promising.

The Q-Route Survey effort is the foundation for immediate execution of wartime MCM operations. Port surveys consist of collecting data on bottom conditions and contacts along designated tracks and compiling it into a data base for later reference to in wartime. It requires continuous updating which will be performed by COOP crews on drill weekends and during annual active duty (ACDUTRA). With this information, an MCM Commander will more readily be able to commence exploratory MCM operations and to more effectively conduct minesweeping and minehunting operations when minelike contacts have been identified. This task is critical to the timely commencing of MCM operations in wartime. Utilizing locally assigned Reserve personnel capitalizes on their knowledge of indigenous port conditions.

Recommendation

The NRA urges continued Congressional support for this program as it matures and specific hardware requirements are defined.

THE RESERVE TACTICAL AIR WINGS

The modernization of the Reserve Tactical Air Wings continues as the horizontal integration policy instigated by Secretary Lehman in 1983 matures. Credit must be given to the House Appropriations Committee for greatly accelerating the F-14 transition by the addition of $68 million last year to accomplish essential modernization of twenty-four (24) early block F-14s.

FY 86 continues the modernization process. The Chief of Naval Operations, Admiral James D. Watkins, in his posture statement before the Senate Armed Services Committee reaffirmed his commitment to the modernization program in the following statement:

> "The Naval Air Reserve Force has embarked on an ambitious modernization program with both carrier airwings slated for transition to state-of-the-art aircraft: F-14, F/A-18, A-7E, and E-2C. The first Reserve E-2C squadron is now in place. VF-301 accepted its first F-14 aircraft in October 1984, and F/A-18 transition training for VFA-303 aircrew and maintenance personnel has been underway for over a year. In FY 86, VFA-303 will receive its own aircraft and be ready to mobilize. A-7E transition for one squadron in FY 85 and two squadrons in FY 86 will complete the programmed upgrade for the A-7B."

Secretary Lehman in his FY 86 posture report stated:

> "The reorganization of the Naval Reserve to a "horizontal integration" has had the effect of shifting a substantial portion of our force structure manning to the Ready Reserve. A total of 35 ships of the 600 ship Navy will be manned by Selected Reserves, in addition to the augmentation of essentially all naval units by Selected Reserves upon mobilization. The fifteenth Active Carrier Air Wing has been deleted from

the program and the fifteenth carrier will carry a Reserve Air Wing. This increased dependence on the use of the Ready Reserve has enabled us to hold the active manpower growth to about 1 percent per year."

The second Reserve Air Wing will be assigned to the SLEP carrier.

The quality and capability of Reserve aircrews and maintenance has been demonstrated over and over again and is reflected in traditionally outstanding safety and performance achievements.

The problems associated with Reserve Air Wing mobilization capabilities has always had at its core the inability to support and sustain carrier operations with the obsolete aircraft assigned to the Reserve air squadrons. This situation has been greatly alleviated by the ongoing modernization program.

There remain, however, several programs that require urgent attention if Reserve Air Wing capabilities are to be fully exploited.

Accelerated transition from the E-2B to the E-2C at Miramar and from the EA-6A to the EA-6B at Norfolk and Whidbey Island should be considered. The increasing difficulty in supporting and maintaining these older weapon systems, as well as the increased demands placed on their capabilities by the F-14, F/A-18 modernization program, require their early retirement from the force. NRA most strongly supports efforts to increase the procurement of these aircraft.

The second area of concern is the lack of A-6E and S-3 aircraft squadrons in the Reserve Air Wing. The A-6E is is the most potent and capable all-weather bombing aircraft in the world. The lack of this capability in the Reserve Carrier Air Wing is regarded as a serious shortfall in war fighting capability.

Recommendation

The Naval Reserve Association recommends the continued procurement of A-6E, EA-6B and E-2C aircraft in order to meet the critical deficiencies in Reserve Tactical Air Wing capabilities. Further, the NRA recommends consideration be given to future reopening of the S-3 production line in order to meet Reserve Air Wing as well as long-range fleet requirements.

HAL/HC Squadrons

Last year the Naval Reserve Association was successful in bringing to the attention of the Congress the unsatisfactory condition of the Combat Search and Rescue and Light Attack Helicopter Squadrons of the Naval Reserve Force. The effectiveness of these efforts is apparent in the House of Representatives report 98-1086 which states the following:

"UH-60 Navy Combat Search and Rescue (SAR) Helicopter

> ...Additionally, testimony of outside DoD witnesses before the Committee and responses by Navy witnesses appear to highlight the fact that there are two critical shortages in the hardware provided for the Combat SAR Squadron and the two Light Attack Helicopter (HAL) Units, all Naval Reserve Units. The Combat SAR mission calls for the rescue of downed Naval Aviators or other friendly pilots from enemy-held terrain. The Light Attack Helicopter Mission supports the Special Warfare Forces, i.e. Seals, for clandestine insertions and extractions into/from enemy territory. According to all reports, the crews of both types of units are highly trained. However, the aircraft assigned are incapable of performing either mission with any reasonable degree of success.
>
> "The Committee notes that the Commanders in Chief of the Atlantic and Pacific Fleets have voiced their deep concern of the inadequacy of the CSAR capability. Also, there has been the considerable increased emphasis on the Special Forces by the Department of Defense recently.
>
> "A proposal, which apparently is acceptable in Navy circles, would combine the missions of CSAR and HAL into three eight (8) plane squadrons utilizing the off-the-shelf UH-60 Blackhawk Helicopters. This would provide an immediate answer to the lack of capability now in existence in both communities and illustrate that to put a mission completely in the Naval Reserve does not mean that it is mandated to go obsolete. Also, the contention, that the receipt of new hardware has to await the arrival of the JVX, would delay the modernization of the units until the mid to late 1990s, obviously an inacceptable solution.
>
> "The Committee, therefore, requests the Secretary of the Navy to submit by February 1, 1985 a detailed plan by which the CSAR and HAL missions are organized and equipped with modern hardware with which they will be able to accomplish their assigned missions."

The two (2) UH-60 helicopters funded last year are expected to be delivered in July of 1985. The Naval Reserve Association is most concerned about program developments, or more specifically, lack thereof concerning this most important mission.

First, inexplicably, no follow-up procurement was contained in the FY 86 budget submission. Additionally, NRA has learned that Navy planners intend to combine both missions into two (2) 9-plane squadrons. This approach not only deactivates a much needed squadron but also reduces force capability by eliminating six (6) aircraft from the force totals.

The Naval Reserve Association believes that the growth to fifteen (15) carrier battle groups demands more, not less, Combat Search and Rescue capability and, secondly, the increased emphasis on special forces requiring dedicated aircraft support makes this planned reduction of Reserve HAL capability inadvisable to say the least.

NRA has been told that subsequent POM will contain requests for additional UH-60 aircraft.

Recommendation

NRA proposes that four (4) additional UH-60 helicopters be procured in FY 86 at a cost of $25 million. These aircraft will permit the transition initiated this year to continue in these Reserve squadrons and will provide a near-term capability to deploy two (2) 2-plane detachments to meet any worldwide CSAR, HAL or Naval Special Warfare contingency.

RESERVE NAVAL CONSTRUCTION FORCE (SEABEES)

The Naval Reserve Force provides seventeen (17) Naval Mobile Construction Battalions. These units are comprised of the most capable and talented technicians available in the Naval Reserve.

However, they are severely hampered in attainment of readiness goals by a serious shortfall in onboard equipment. The Total Force requirement identifies an additional two (2) battalions required to meet wartime tasking. However, existing equipment shortfalls make it impractical to increase RNCR force levels at this time. The Congress addressed this equipment shortfall last year by adding $20 million for Reserve Construction Battalion equipment.

RECOMMENDATION

The Naval Reserve Association recommends a procurement amount of $40 million each year for five (5) years commencing in 1986 in order to equip existing battalions.

ARAPAHO

The ARAPAHO system utilizes modern technology to equip countерships to perform a wide spectrum of naval missions thereby achieving a quick force multiplier on a relatively low cost.

The ARAPAHO system, first briefed in the late 60s as the Reserve Merchant Ship Defense System (RMSDS), has had a tenuous, to say the least, development cycle. The concept has received little if any Navy support and in fact has been kept alive only because of Congressional interest. As a result of this Congressional interest a containerized facility was constructed to provide land/launch/storage and limited support of ASW helicopters. Following a successful test afloat in 1982 the prototype ARAPAHO was off loaded for storage.

The British, with characteristic inventiveness, and facing the Falklands' war recognized the value of the ARAPAHO concept and proceeded to lease this system from the U.S. Government. They improved the incomplete U.S. version by adding POL storage, crew berthing and messing facilities. The experience gained in the Falklands conflict convinced the British of the viability of the ARAPAHO

System and in the Spring of '83 British Aerospace was tasked to convert another containership for Royal Navy use employing the ARAPAHO concept.

The Naval Reserve Association believes the ARAPAHO system to be a low cost force multiplier of great value to the U.S. Navy. As a case in point the NRA believes ARAPAHO could have provided "mother ship" capability for the mine counter-measures recently concluded in the Suez by the U.S. Navy. The utilization of a suitably equipped ARAPAHO system would have avoided the necessity of expensive air transport and the commitment of a dedicated amphibious assault ship to this mission. The Naval Reserve is scheduled to commission its first mine counter-measure squadrons in FY-87.

Recommendation

The Naval Reserve Association recommends that funding be provided to construct two ARAPAHO systems one in FY-87 and one in FY-88 to support these squadrons. The estimated procurement cost is $20 million each. The NRA further recommends any required lead time funding be identified and provided in FY-86.

NAVAL RESERVE STRENGTH

Naval Reserve manpower requirements continue to grow both as a function of Navy growth toward a 600-ship fleet and an increasing number of Navy manpower planners embrace Total Force planning dictated by the Navy Manpower Mobilization System (NAMMOS).

Naval Reserve strength is programmed to attain 100% of NAMMOS in FY 88. To attain this goal, over 6,500 full-time support (TAR and 265) and 20,000 category "A" Selective Reserve personnel will have to be recruited and retained.

In order to attain and maintain this strength in the upcoming era of a declining manpower pool, the full spectrum of recruiting/retention incentives must be applied. Bonuses and incentive programs are valuable tools in this effort and must be constantly reviewed and adjusted to maximize their effect.

The Naval Reserve Association strongly recommends the continuation of the current Selective Reserve bonus package which provides an enlistment bonus for non-prior service reserves. The reenlistment/extension bonus incentive applicable to those Reservists currently affiliated and the affiliation bonus applicable to those potential Reservists who have completed active duty obligation but not the minimum service obligation should also be retained. These programs have been very effective in sustaining Naval Reserve growth, However, the above programs are scheduled to terminate at the end of FY 85. The Naval Reserve Association strongly supports their continuation.

Additionally, the NRA supports the establishment of an additional enlistment incentive program designed to attract prior service personnel who have completed MSO. The NRA recommends the enactment of this type enlistment incentive this year.

As noted previously, the Naval Reserve Force growth encompasses not only Selective Reserve increases, but also requires 6,500 full-time support personnel (TAR and 265) if NAMMOS strength is to be achieved. This growth occurs primarily in the NRF ships, ship intermediate maintenance facilities (SIMAs) and aviation squadron and intermediate maintenance modernization requirement.

Recommendation

The NRA strongly supports a TAR selective reenlistment incentive program targeted to ensure the availability of these key personnel in the Naval Reserve Force.

Sea Air Mariner (SAM) Program

This program has been a notable success and has achieved its recruiting goals of 10,000/year since it was initiated in FY 84. The NRA remains concerned that there continues to be a shortfall in available "A" school quotas for these raw, untrained recruits. The NRA has learned that only 5,300 "A" school seats are available in FY 86.

The Naval Reserve Association believes much work needs to be done by the Navy in this critical area. The high technology of our present-day force demands an "A" school capability be provided to all our sailors. Equally important is the incentive given to these young men and women by being adequately trained to perform the tasks that attracted them to the Naval Reserve in the first place.

However, the NRA is firmly convinced that the image of the Naval Reserve as a professional, modern and capable force is paramount in initial affiliation and subsequent reenlistment decisions. Current state of the art weapons systems in the Naval Reserve is the key. Retrogressive training in obsolete and incapable ships and aircraft must remain a past memory.

Recommendation

The NRA urges the Navy to fully exploit the use of modern teaching methods, utilizing computer learning techniques, greater utilization of simulators as well as private sector involvement to solve this critical training shortfall.

DEPUTY CHIEF OF NAVAL OPERATIONS (NAVAL RESERVE)

The growth of the Total Force has seen the Naval Reserve assume a necessary partnership role in almost every active force mission. Additionally, the Naval Reserve provides 100% of the force capability in several mission areas.

The Naval Reserve Association believes this increase in Reserve importance in Total Force planning and programming requires greater visibility at the CNO staff level.

Recommendation

The Naval Reserve Association strongly supports the establishment of a Deputy Chief of Naval Operations (Naval Reserve), OP-07. Additionally, the NRA believes the DCNO (Naval Reserve) should be a Vice Admiral as are all the other DCNO billets.

EXPANDED RECALL AUTHORITY

The Naval Reserve Association has recommended that the existing Presidential authority to recall 100,000 Reservists for up to ninety (90) days be changed. The Chief of Naval Operations in his 1986 Military Posture statement shares this view when he relates:

> "We intend to build the Naval Reserve Force into an even more capable part of the Navy team. We have taken measured steps to ensure that the Naval Reserve Force will have the trained people, modern ships and aircraft, and integrated logistics support to do the job upon mobilization. We are working toward optimum utilization of all our assets.
>
> "We have made important headway on Congressional directives to increase our reliance on Selected Reserve units to assume responsibilities traditionally assigned to active duty units. I am, however, concerned that we may not be able to gain maximum potential from the Reserve in the period prior to full scale hostilities. For example, development of the concept of Maritime Prepositioned Ships has generated a potential need for early availability of cargo handling forces. These forces will support the U.S. Marine Corps in establishing Marine Amphibious Brigades ashore in overseas locations within ten days of an alert. This scenario could unfold in a pre-hostilities environment prior to the execution of any form of mobilization or call-up. Since active duty cargo handling forces are not sufficient to carry out this mission, early recall of Reserve cargo handlers may be necessary. Similar conditions exist in other military support functions which we have transferred from active to our Selected Reserve forces. Ways to overcome this impediment to our ability to respond must be assessed, and I solicit your help in shoring up this important area."

The CNO mentioned the importance of Reserve cargo-handling battalions in Total Force planning. It is also important to note that Reserve Forces comprise 100 percent of the logistics airlift, 100 percent of the Light Attack and Combat SAR capability, 99 percent of the Naval control of shipping, over 80 percent of the ocean minesweepers, more than 60 percent of the Mobile Construction Battalions and Special Boat Forces and 35 percent of the Maritime Patrol (VP) squadrons. The recently-started Mine Warfare Craft of Opportunity (COOP) program and the soon-to-be-started mine-countermeasures squadron (FY 87) increase the dimension of Naval Reserve Force capability in Total Force planning.

Commensurate with this increased reliance on the Naval Reserve, it is clear that recall authority in advance of a national emergency is both prudent and reasonable.

Recommendation

The NRA recommends that consideration be given to increasing both the numbers of personnel and the length of service they can be called up for by the President.

Summary

Mr. Chairman, Committee members, the NRA appreciates your interest in continuing to provide the Guard and Reserve with the capable, modern weapon systems that are essential to maintain their high level of readiness and performance.

Equipment is the key to mission readiness. The Reserve Maritime Patrol Force, perhaps our most capable force segment, is facing serious difficulty. We recognize that some of our recommendations, particularly the AQA-7 Signal Processor Update initiative, are a radical and new approach to Reserve equipment modernization, i.e., an R&D program for Reserve aircraft. We take this approach only because, as far as we know, no other modernization alternative exists or is planned. The Naval Reserve Association believes the most cost-effective wartime asset is a Reservist trained in a modern, capable weapon system. We look forward to working with you on these initiatives and thank you for the time you have provided us to present them.

CAPT JOHN C. RICE, JR., USNR

Captain John Rice, our new National President, is a native New Orleanian. He took his bachelor's and master's degrees in Education at Loyola of New Orleans and was commissioned through OCS in early 1953. After serving on active duty at COMONE and in USS TACONIC, he was released from active duty at the end of 1955 and became a teacher of history and languages at Jesuit High School as well as holding various administrative billets there. Since 1970 he has been basically in government-liaison work for the Catholic education system, first with the Archdiocese of New Orleans; and then as the Associate Superintendent for all six Catholic dioceses in Louisiana. In addition, he is the Executive Director of the Special Education Services, Corp., a private, non-profit institution having association with 266 parochial schools and 83 other private schools in Louisiana. Tangentially, he also has served in responsible positions with a great many professional educational councils at local, state, and national level as well as with a number of civic/social organizations.

His Naval Reserve career has included command of a surface division, a "MOB team", and a Merchant Marine operational-HQ unit. Staff duty has included assignments with the Group Command, the REDCOM, and others; and he collaterally has been active in the Blue & Gold program for over fifteen years. He "carries the cards" of several military organizations but basically is really active in only two: the Naval Order, where he founded the New Orleans Commandery, and at present writing is completing a tour as its Commander; and principally, of course, the Naval Reserve Association.

Captain Rice's past activities in the Naval Reserve Association include President, Acadian Chapter 1972-1974; coordinator for eight national EXCOM meetings in New Orleans; President, 8th District; National Parliamentarian; National VP-Education & Chapter Activities; National VP-Naval Surface/ Sub-surface; and General Chairman, NRA 1978 National Conference in New Orleans. For the past several years, he has also been Special Assistant to the National President for NRA liaison with the Chief of Naval Reserve; and from 1981 to 1983, the National Executive Vice President of the Naval Reserve Association.

Captain Rice is married to the former Claire Courrege, NRA's first Associate Life Member. They reside in New Orleans, Louisiana.

NAVAL RESERVE MANNING RATE

Senator Stevens. Thank you, Captain.

Senator Proxmire has another hearing. I want to yield to him.

Senator Proxmire. Thank you.

These are questions you can answer yes or no.

What is the meaning rate of the Naval Reserve?

Captain Buesener. Manning rate?

Senator Proxmire. Yes, sir.

Captain Buesener. We are not over 102,000 in drilling reservists. Our active duty cadre strength is increasing.

Senator Proxmire. You have a first class operation in my State. I am very proud of your Naval Reserve. I have visited some of your units. I am extremely impressed.

Captain Buesener. Thank you, sir.

Senator Proxmire. They are extraordinarily competent and capable.

INTEGRATION OF NAVAL RESERVE IN TOTAL FORCE CONCEPT

Do you think the Naval Reserve has been adequately integrated in the total force concept?

Captain Buesener. Yes, they have been adequately integrated in the total force concept in the fact that they are getting more of the piece of the mission pie. They are playing a more vital role in the total mission force assignment and a capability. That is the yes part.

The no part is to a certain degree, particularly in the ASW business, while we have the missions, we are not getting the equipment to counter the threat at the rate that we feel is necessary.

It is difficult to build an ASW system, for example, and I might add that we are unique, we use the Soviet submarines and training vehicles. We don't have simulators. We are out there every weekend.

Last year our Reserve VP Navy spent 46 weeks deployed overseas in accomplishing active Navy operational commitments. They are a force in being now. Their requirement for equipment is driven, quite frankly, by the development of the Soviet Navy and their submarines, pure and simple.

We are there. That is why we recommend these programs for the ASW. We are not going to be able to do the job and with the quality of people we have, that is a shame.

Senator Proxmire. That is a good argument.

MINE AND COUNTERMINE MISSION CAPABILITY

Do you think the Naval Reserve can carry out an improved mine and countermine mission if provided with modern mine sweepers?

Captain Buesener. Yes, sir.

Senator Proxmire. CBO has a budget option for saving $1 billion by assigning three aircraft carriers and support wings and escorts to the Naval Reserve.

Do you support that budget option?

Captain Buesener. When you talk about three carriers, you are talking about a massive amount of people. You are talking about the demographics that are necessary in the large cities spread around the coast.

Obviously while we would like to put a carrier in the Great Lakes, we just can't do it. The fact of the matter is that my reservations in that area are the ability to man that size of a force because you are going to have to put the carriers, if you are talking about one or two carriers, you are going to have to put them in San Francisco, San Diego, Long Beach, Norfolk, where we already have many of our Reserve units.

Senator **Proxmire**. Do you think three aircraft carriers is too much?

Captain **Buesener**. Yes, sir, I do.

Senator **Proxmire**. Thank you very much, Mr. Chairman.

Senator **Stevens**. Thank you.

Captain, you started off with the point that the Murdock conversations are asking for substantial additions to the budget at the time when this committee is facing in the direction to reduce the budget severely.

I do want to tell you that this committee has also been very much involved in the shift from the regular Navy to the Navy Reserve. I think we will continue that this year. It is cost effective.

TRANSFER OF CARRIERS TO RESERVE

Senator Proxmire has mentioned the CBO suggestion that three carriers go into the Reserve. We just don't see that that is possible at this time until the Reserve increases in strength. but we want to move toward that time when the substantial portion of the Navy strength can in fact be in the reserve with modern equipment.

We appreciate your statement on behalf of Captain Rice. Tell him we will once again go through it and see what we can accomplish within the budget guidelines we are going to operate on.

Captain **Buesener**. Thank you very much, sir.

Association of American Universities

STATEMENT OF ROBERT M. ROSENZWEIG, PRESIDENT, ASSOCIATION OF AMERICAN UNIVERSITIES

DEFENSE RESEARCH UNIVERSITIES

Senator **Stevens**. Our next witness is Dr. Robert Rosenzweig of the Association of American Universities.

Mr. **Rosenzweig**. Thank you, Mr. Chairman.

My name is Robert M. Rosenzweig. I am president of the Association of American Universities, and I am appearing here today on behalf of the fifty research universities that comprise that group, as well as the other associations of colleges and universities that are listed in my formal statement.

On behalf of us all, I want to express appreciation to the committee for the opportunity to speak to you about the aspects of the fiscal year 1986 DOD budget that bear on research and research training and, therefore, on universities.

This is, in some important respects, an encouraging budget. It builds on initiatives begun in the last several years, and by carrying them forward it gives promise of raising the 40-year-old association between the Defense Establishment and America's research universities to a higher and more productive level.

ASSOCIATION RECORD

That association was born in World War II and was nurtured after the war by some of the most enlightened and skillfully managed programs of research support on record. It fell on bad times during the Vietnam war as the Department, under the congressional injunction of the Mansfield amendment, found it easier to avoid support of fundamental research than to explain its connection to specific security objectives.

It has taken a long time far too long, to begin to rebuild the relationship of mutual confidence that marked that early period. Let me explain why I would like to view this budget as an important step in that direction.

IMPORTANT ASPECTS OF BUDGET

The most important point about this budget, in my view, is its recognition that nearly 15 years of the practice of buying research without regard to preserving the capital and human structures that make research possible has been producing what might be called a "wasting asset."

The asset is the ability of universities to sustain the quality of basic research that has been responsible for American leadership in virtually every critical field of science.

It is wasting in the sense that its physical facilities are in decline, its equipment and instrumentation are obsolete, and precious little attention has been paid to assuring that the next generation of scientists will contain at least as high a proportion of the Nation's top talent as does this one and as did the last.

A business that failed to recognize such symptoms and act to remedy them would not long remain profitable or in business. Recent history provides painful examples of that proposition. But universities are not businesses, and Government is not really a customer.

Work goes on, good people make do as best they can, new students enter programs and graduate from them. But there is really no equivalent to the profit-and-loss statement of business. The loss takes the form of lines of inquiry not begun because they are unrecognized, advances not made, opportunities foregone. They are all invisible, but nonetheless real.

That has been the direction in which university-based science has been heading since the withdrawal of the Government from programs in support of physical facilities, instrumentation, and graduate fellowships began to take effect.

UNIVERSITY RESEARCH INITIATIVE

The main significance of the budget before you is that it proposes explicitly to address this program directly. The instrument is the proposed University Research Initiative.

The $25 million proposed for this effort should be seen as a beginning, as a down payment, if you will, on the Department's responsibility to repair the research base on which it depends. It will enable the Services each to begin or add to programs aimed at that goal in institutions that are important to the Service missions.

There are several points of substance and several of process that I would like to make concerning this initiative. First, it seems to us that this initiative will be most effective if it is aimed at the following four related problems.

One: An insufficient number of talented U.S. students are being attracted into Ph.D. programs in the sciences and engineering. Contributing to this problem is the continuing failure to attract women and minorities into those fields in anything like adequate numbers.

Two: Faculty shortages in key fields of engineering and science are hampering research and graduate programs, thus also limiting opportunities for collaborative research initiatives with DOD laboratories.

Three: Obsolete research instrumentation is seriously restricting the development of competitive research and training programs.

Four: Outdated research laboratories are affecting research; they need to be modernized, and in some cases, replaced.

I have provided some detail on each of those points in my main testimony. Together, they constitute the agenda for the Research Initiative Program for this year and for what I hope will be its growth in future years.

PROCESSES

Let me turn in conclusion to some brief observations about process; money and good intentions will not do the job unless they are guided by standards and directed by processes that are strong enough and clear enough to produce good decisions.

DOD/UNIVERSITY FORUM

First, I want to underscore for the committee the value that has come from the operation of the DOD/University Forum, now established as an official Department Advisory Committee.

The Forum has brought light, rather than heat, to some very contentious issues; and even more to the point here, the working groups of the Forum have produced valuable reports and recommendations on such issues as science and engineering manpower needs, science and engineering facilities, and international training and research.

Second, even if there were no other reason, the success of the Forum under the leadership of the Office of the Under Secretary for Research and Engineering demonstrates the need for an organizational focus to guide the new University Research Initiative as well as other activities affecting universities.

That focus should be located in the Under Secretary's office, and it should be supported by explicit statutory authority. The structure of the Department of Defense provides maximum opportunity for plans and programs to move in diffuse and uncoordinated directions, thus making the total less than the sum of the parts.

A strong voice at a high level, given the legitimacy statutory bacing, is important to the success of this undertaking.

Third, and last, I urge that the committee insist that decisions about funding be guided by the need to produce the highest quality science and engineering of which we are capable as a nation.

No decisions should be made without competent, professional review of, we hope, competing proposals. Policies and practices that tolerate support of less than the best of which are capable will be rewarded with just that, and the best will be done elsewhere.

I am aware of pressures to evade professional review that originate in universities and others that originate in the Congress. Whatever their source, I urge you to resist them, and I promise that you will have our support as you do.

Thank you, Mr. Chairman, for the chance to meet with you this morning.

That concludes my remarks, and I will be pleased to answer questions.

[The statement of Mr. Rosenzweig follows:]

PREPARED STATEMENT OF DR. ROBERT M. ROSENZWEIG
PRESIDENT
ASSOCIATION OF AMERICAN UNIVERSITIES

Mr. Chairman and members of the Subcommittee:

My name is Robert M. Rosenzweig, and I am President of the Association of American Universities (AAU). The AAU is an association of the executive heads of fifty leading public and private research universities, including most of those institutions that conduct the competitive research and related training programs supported by the Department of Defense. I am pleased to have this opportunity to present our views and concerns about the research proposals of the Department of Defense.

My remarks are made also on behalf of several higher education associations who join in this statement. They are: the American Council on Education, which represents all sectors of the higher education community; the National Association of State Universities and Land-Grant Colleges, which includes more than 130 public institutions, including all twenty-five public members of the AAU; the Association of Graduate Schools, an association of the deans of the fifty AAU graduate schools; and the Council of Graduate Schools in the United States, an association of all of the nation's more than 300 graduate schools. Our associations collectively represent all of the research universities that carry out DOD-supported university research programs. We join together in expressing our appreciation to the Committee for your previous support of DOD research and university programs, and we ask you to give your full support to the Department's FY 1986 proposals for research and university programs, especially the proposed University Research Initiative.

We urge you to support fully the proposed DOD investments in science and engineering research through its 6.1 research programs and its graduate training, faculty development, and research instrumentation initiatives. These investments are essential to our national security. The proposed University Research Initiative is especially important to the Department's plans to rebuild its ties with universities, and we ask the committee to fund it at least at the requested level of $25 million.

Talent, Technology and the Role of Universities

The FY 1986 DOD budget initiatives for university research and related programs accurately reflect a fresh awareness -- now deepening across government, industry, and the states -- that the key ingredient to our national security and to our economic welfare is people -- talented and highly educated people. The quality of our educational enterprise, therefore, holds the key to our future security and welfare. Others have reported on weaknesses now hampering precollege, undergraduate and graduate programs. The importance to our national life of addressing these problems is widely recognized, and corrective actions are being taken at all levels, including our universities.

Research universities play a uniquely important role in securing our science and technology base because they are the primary sources of highly trained talent for industry, universities and for government, including the Department of Defense. DOD itself has a vital stake in the quality of our university research and graduate programs because, as an employer of scientists and engineers, it is highly dependent upon university research programs for the people and the knowledge essential to its defense mission.

DOD is a major employer of university-trained scientists and engineers. A 1983 report by the DOD-University Forum, a DOD advisory Committee on DOD-university relations, found that DOD directly employs 3.6% of the total 2.9 million scientists and engineers in the national workforce. Beyond this another 13% of

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the nation's total workforce is directly linked to national security programs, budgets and policies -- and, it must be emphasized, these findings do not reflect the recent added requirements for scientists and engineers imposed by the Strategic Defense Initiative (SDI).

DOD, then, has sound justification, entirely consistent with it's mission, to assume a stronger leadership position in helping to meet the pressing research, education and capital needs of research universities. The Executive Summary of the Forum's report is attached to my statement (A); the full report has been provided to the Committee.

The FY 1986 DOD Research Proposals

The total FY 1986 RDT&E budget request is approximately $40 billion. The DOD fundamental research (6.1) programs that support that enterprise, and fund competitive research in universities account for $970 million, or just 2 percent, of the total defense R&D budget. (Just two years ago 6.1 programs equalled 3% of the total R&D program.) The 6.1 programs also account for 28% of the total $3.5 billion Technology base (6.1 Research and 6.2 Exploratory development) program. About half of the 6.1 research funds will be competitively awarded by the Army, Navy, Air Force and DARPA to universities. A small fraction, less than $200 million, of the $2.5 billion in 6.2 funds will be awarded to universities for applied research projects. In addition to fundamental research, the 6.1 budget includes funding for new investments in graduate fellowships, faculty development, research instrumentation -- through the Defense University Research Instrumentation Program (DURIP) -- and the new and potentially significant University Research Initiative.

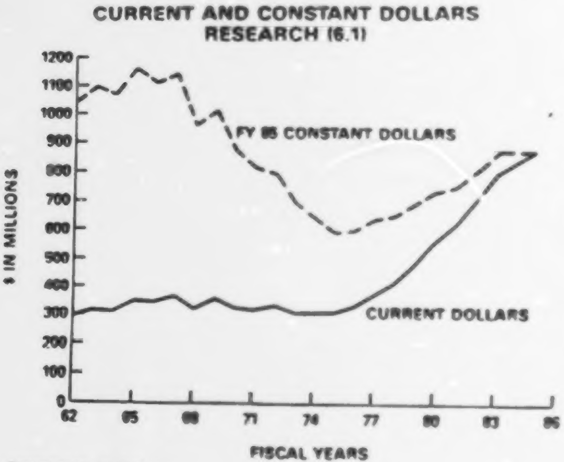
The technology base programs are the Department's long-term investment in fundamental and applied research. They also are the programs most likely to lead to commercial spinoffs. Yet the Department's commitment to research continues to shrink relative to the extraordinary increases requested for the development of new systems. The focus of the RDT&E program is almost completely on the short-term.

Last year the Senate Committee on Armed Services, in a report dated May 31, 1984, described the Technology base programs as "our investment in future defense capabilities," and asked for a report on the Department's investment in university research. The Committee noted that "DOD investment in the technology base dropped by 40 percent from the mid-1960's to mid-1970's and today remains more than 30 percent below the mid-1960's level in real terms." The Department's report to the Committee has just been completed. It calls for sustained and increased investments in the areas addressed earlier by the Engineering and Science Education Working Group of the DOD-University Forum.

The following figure from this report shows the history of funding for 6.1 research programs. Although significant progress has been made toward strengthening DOD technology base programs and rebuilding investments in universities, neither 6.1 nor 6.2 programs have yet recovered the strength which characterized them until the mid 1960's.

FIGURE 8.1

DOD SCIENCE AND TECHNOLOGY FUNDING TRENDS



SOURCE: Department of Defense

In an August 9, 1984 memorandum to the Services Secretary Weinberger noted the historical funding trend and stated that the Defense Guidance for the FY 1987-91 Five Year Defense Plan will call for sustained annual real growth in both 6.1 and 6.2 programs. We fully support the Secretary's initiative. The FY 1986 request for Technology base programs and for the new $25 million University Research Initiative, if approved and funded, will continue at minimum levels, an important rebuilding effort. But it will do so only in restrained increments. We urge the Committee therefore to fund the budget request for 6.1 Research programs at least at the levels proposed.

We believe that the Department's investments in the university research base, to be fully effective must grow, and they must target in significant ways to the following four interrelated problems:

1. Insufficient numbers of talented U.S. students, particularly minorities and women, are being attracted into Ph.D. programs in the sciences and engineering.
2. Faculty shortages in key fields of engineering and science are hampering research and graduate programs, thus also limiting opportunities for collaborative research initiatives with DOD laboratories that need fresh talent and ideas.
3. Obsolete research instrumentation is seriously restricting the development of competitive research and training programs.
4. Outdated engineering and science research laboratories are constraining research; they need to be modernized or replaced.

I will address each of these four problems briefly.

Graduate Students

The first problem I identified is graduate students. We not out attracting sufficient members of the most talented U. S. citizens into graduate programs in engineering and science. In fact, since the early 1970's the number of Ph.D. degrees in engineering awarded to U.S. citizens has declined steadily. Between 1968 and 1982 the number of degrees awarded to U.S. students declined by about 42 percent, while the number of degrees earned by foreign nationals almost tripled. Now nearly half of the engineering Ph.D.'s awarded go to foreign nationals. In 1983 1500 foreign nationals received PH.D.'s degrees in engineering; only 1300 engineering doctoral degrees were awarded to U.S. citizens. About half of the foreign nationals return to their home countries. The rest remain to work in universities and industry, but, according to the DOD report just completed for the Armed Services Committees, many of these individuals are restricted in their DOD-related work.

Many talented students are choosing to pursue other careers. An attractive job market a decline in financial incentives to pursue graduate study and the unhappy prospect of studying and working in inferior laboratory environments are significant career disincentives for many talented students. Starting salaries for new bachelor-level engineers now often exceed starting salaries for young faculty with Ph.D.'s. It is not unusual to have the most able potential graduate students recruited by industry at salaries well in excess of $30,000 or $35,000. The market is working effectively to keep talented U.S. students out of graduate programs.

The problem is aggravated by the erosion of national graduate fellowships designed to identify and encourage our best young talent. The number of federally-supported graduate fellowships has declined sharply since the late 1960's. The federal commitment to excellence in engineering and science education represented by the national merit-based fellowship has eroded. In 1983, government-wide, federal agencies supported only 20 percent of the number of graduate fellowships awarded in 1968. Of those supported only 1,600 were in engineering and science.

DOD has begun to recognize this problem. The Services have

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started several small programs that, if strengthened, could make a significant contribution. In 1982, for example, the Office of Naval Research (ONR) established a modest, but well-designed, Graduate Fellowship program to attract the most able students into Ph.D. programs in specialties important to the Navy. This program now supports about 40 students per year, although it is proposed to grow gradually to about 50 per year.

This small, program is responsive both to the market forces and to the costs of graduate education in these fields. The program is competitive and merit-based. First-year awardees receive stipends of $13,000 and full tuition; in addition the departments they attend receive a small supplemental research award. This effective career incentive should be expanded. The small graduate fellowship programs of the Army and Air Force also should be strengthened and modeled more closely on the ONR program. The Army Navy and Air Force also support limited numbers of postdoctoral students.

The proposed University Research Initiative should help to strengthen the Department's graduate fellowship program. We applaud this, and we urge the Committee to direct the Services to accelerate the planned growth of the graduate fellowship programs to a DOD-wide level of at least 300 (100 per Service) three-year competitive awards per year. Special efforts are particularly needed to attract talented minority students and women into graduate programs in engineering and science. A strong DOD graduate fellowship program could assist in doing this.

Research assistantships are essential to DOD research programs, but they serve a different purpose from merit-base fellowships; they are not adequate or effective substitutes for merit-based graduate fellowships. DOD estimates that it supports an estimated 4000 graduate research assistants through its research programs. But it is important to understand that these individuals, for the most part, are experienced graduate students before they qualify to be research assistants on DOD-funded projects. Students usually are well along in their academic programs before they can be usefully employed as research assistants on DOD-sponsored projects. Finally research assistantships do not provide national recognition for the best students. and they are not as effective incentives as merit fellowships to the most promising potential graduate students at the time they decide whether to pursue graduate study.

Young Faculty

The second problem is closely linked to the first. Many universities now face shortages of faculty in engineering and certain science departments. A 1983 survey by the American Society for Engineering Education found an overall vacancy rate of 8.5 percent, with vacancy rates in electrical and computer engineering at 9.7 and 15.8 respectively. Industrial demand for talent is contributing to the problem by decreasing the numbers of students pursuing the Ph.D. degree and attracting young faculty out of universities.

The Army, Navy and Air Force are developing programs to encourage young faculty to pursue research careers in science and engineering . The Navy is proposing to initiate a new program to identify and encourage young faculty to take an active role in Navy research programs. The services have taken steps to encourage increased interaction between their research laboratories and faculty; all have small summer faculty research programs. The new ONR Young Investigator program is a promising approach worthy of imitation by the other Services. The proposed University Research Initiative should strengthen DOD's commitment to attracting young faculty into research and teaching careers.

Research Instrumentation

The third problem concerns the tools of science and the instruments used to perform modern reserch and to train young scientists and engineers. Universities cannot do competitive research or train students up to a level they desire. and employers require. If research instrumentation is obsolete. In many fields modern equipment is essential if new research fields are to be opened and the questions identified at the cutting edges of rapidly moving disciplines are to be addressed.

The condition of research instrumentation in universities has been deteriorating seriously for many years. In 1980 the AAU prepared a report to the National Science Foundation which showed that the median age of instrumentation surveyed in 15 universities was *twice* that of leading commercial laboratories. In the past five years the situation has improved little. Recently NSF completed a larger survey of the condition of research equipment in 43 universities. It shows that *25 percent of the equipment now in use is obsolete; only 16 percent is state of the art; half of the equipment is at least six years old.*

The ability of investigators to purse their research questions is being constrained. More than 90% of the department heads responding to the NSF survey reported that "important subject areas" of research could not be performed in their laboratories because they lacked the necessary instrumentation. Almost half rated the adequacy of their equipment as "insufficient"; only 6% said their equipment was "excellent."

These findings should be of particular concern to the Department of Defense because they are based on a survey of 22,300 items inventoried in three fields crucial to the DOD's research mission: *computer science*, *physical sciences*, and *engineering*.

The equipment problem has been growing for perhaps 10 years or more. It is the result of rising costs, a competitive project system operating in a constrained environment that has made the purchase of items costing more than $50,000 difficult or impossible on individual research projects. and rapidly advancing and more sophisticated technology.

Here too, the Department of Defense has recognized the seriousness of the problem. In 1982 the Department, established the DOD-University Research Instrumentation Program (DURIP). This is a five-year, $150 million competitive program targeted on the purchase of larger and more costly equipment, items typically not funded as part of individual research projects.

The response to the initial program announcement affirmed the dimensions of the need. In the first round of competition DOD received 2,500 proposals requesting $645 million; because just $30 million was available only 200 awards were made. In the first three years DOD has made 652 awards to 152 institutions in 47 states, Washington, D.C., Guam and Puerto Rico. The DURIP program is making an important contribution toward addressing the equipment needs of many researchers working in fields of significance to DOD.

In addition to the DURIP program the Services have expanded their support for equipment costing up to $50,000 through their contract research programs. The Army, Navy, Air Force and DARPA all have gradually increased the percentage of research funding devoted to addressing the equipment problem in laboratories that are performing DOD-sponsored research, but the absolute sums involved remain disappointingly small. In FY 1985 the Army Research Office spent $6 million for equipment. In FY 1984 the Office of Naval Research's Contract Research Program spent $16.6 million for equipment, up from $11.2 million in FY 1979. In FY 1985 the Air Force Office of Scientific Research spent $8 million, and, in FY 1984, DARPA allocated $16.8 million for equipment purchases.

The DURIP program and the expanded contract research initiatives are important first steps. They need to be substantively strengthened beyond present levels. The March 1 report by the Department to the Armed Services Committees reaffirms the seriousness of the equipment problem, but it is disappointing because it does not state a clear commitment by the Department to sustain the "highly successful" DURIP program, even at current levels, when it expires in FY 1987. Neither does the report confirm that DURIP and contract instrumentation programs will be strengthened as a part of the new $25 million University Research Initiative. The report takes a cautious approach, warning that the DOD cannot address the instrumentation problem alone; it calls for an interagency effort.

We certainly agree that an interagency effort is needed. But there can be little doubt that DOD has a stake in helping to address the equipment needs of the laboratories in which its competitive research programs are carried out. The long-term mission of the Department is linked directly to the quality of the research and training provided in the engineering, physical sciences and computer sciences departments it funds.

The July 1983 report of the DOD-University Forum Working Group on Engineering and Science Education made the following recommendation with regard to the DURIP program:

> *"The DOD-University Research Instrumentation Program should be strengthened. It is recommended that this program be expanded with new appropriations to a level of $100 million per year and that it be sustained at that level for at least another five years (after the initial five year period expires in FY 1987)."*

We endorse this recommendation, and we ask the Congress to support it as a part of the planned expansion of the University Research Initiative. We also ask the Congress to provide the Department with clear legislative direction to ensure that the present contract research programs and their investments in equipment are sustained and strengthened.

Research Facilities

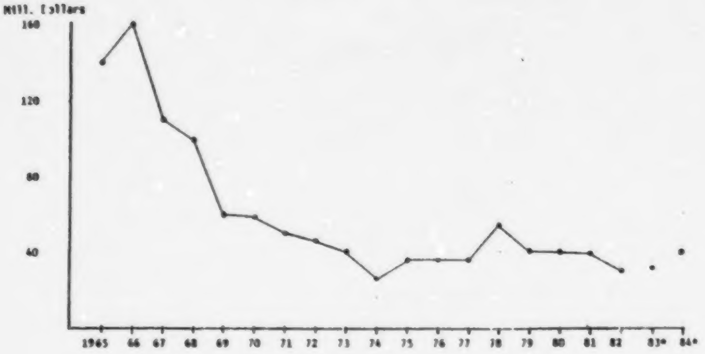
Closely related to the problems posed by obsolete research equipment are those of deteriorated research buildings. Many leading engineering schools, physical sciences and computer sciences departments, and others important to DOD research programs face pressing needs to modernize or replace research laboratories. Current estimates are that one-half of the physical plant of universities and colleges is more than twenty-five years old; one quarter of it was built prior to World War II. Aging research facilities which house DOD research programs require renewal and replacement.

The exact dimensions of the problem unfortunately have not been thoroughly documented by the research agencies. DOD, in response to a 1984 request by the House Committee on Armed Services, is now preparing a preliminary report on the perceptions of the Services about the research facilities needs of universities engaged in DOD research programs. This should be a useful first step toward improved DOD understanding of the problem, but a comprehensive assessment of the condition of the research facilities base and the consequences for DOD research and training capabilities, we believe, still is needed.

According to recent NSF figures total national expenditures for science and engineering facilities and equipment for R&D and instruction now total about $1 billion per year. However, plant expenditures by universities have been essentially fixed in real terms since 1968. (A 1981 AAU survey found that institutions now are able to meet only about half of their accumulated facilities deficit.) This means that the real level of effort by universities to modernize research facilities has decreased by about 60% between 1966 and 1981. Further the Federal share of the facilities modernization effort declined from 32% in 1966-68 to 16% in 1981. In constant dollars Federal obligations for R&D plant decreased about 90% between 1966 and 1983. (See the following figure.) In short, investment in the conduct of federal research programs has been decoupled from investment in the in the capital base necessary to reach our long-term research objectives --a mistake industry clearly could not afford to make.

Figure 2

Federal Obligations to Universities and Colleges for R&D Plant



* Estimates

Sources: Science Indicators 1980, NSB, 1981, p. 261; Federal Funds for Research and Development, Volumes XXX (NSF 81-325), XXXI (NSF 82-326), and XXXII (Sept. 1983).
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The new DOD report to the Armed Services committees offers the following preliminary conclusion about the facilities problem and the Department's potential role in addressing it.

> "DOD has an obvious interest in the condition of the research facilities available to the universities who play an essential role in DOD technology base programs. A separate study is currently under way to determine the nature and scope of this problem for DOD contractors. Preliminary studies conducted by others sugggest a problem of great magnitude. Once again, DOD cannot and should not address the problem alone. The need for a multi-year, interagency approach is even greater in the case of facilities."

We generally agree with this assessment. Available evidence suggests a problem of substantial dimensions. Solutions ought not to be seen as the special or sole responsibility of the Department of Defense or any other single agency of the Federal government. Only a joint effort by the Federal research agencies, the states, universities. industry and others will adequately address it. Each has a legitimate part to play.

The DOD-University Forum recommended the following approach to the Department. We enthusiastically commend it to the Department and to the Congress.

> "The Department should undertake a targeted research laboratory rehabilitation program to assist universities in the task of modernizing essential, but outdated, research facilities. A carefully constructed program of matching grants targeted on the modernization of those laboratories in which DOD-funded research programs are housed is warranted and necessary if these laboratories are to be suitable sites of DOD fundamental research activities through the rest of the decade and into the 1990's. This 'brick and mortar' program would begin to address a substantial national problem, one that is already impacting adversely on the capabilities of university research and training programs in general, including productivity of DOD-funded research programs. Specifically, we recommend that DOD undertake a long-term initiative, funded at a level of $100 million per year for 10-years, to upgrade or replace selected university research laboratories that are essential to DOD research programs."

We urge the Congress to create such a DOD research facilities modernization program. The program should be developed as part of an expanded University Research Inititive. Funds for laboratory modernization should be targeted on the fields of science and engineering essential to DOD; awards should be made competitively with primary, but, not sole, emphasis on scientific and technical merit; other local, state and regional considerations will need to be taken into account. Matching, of course, should be required.

A Clear Statutory Mandate and A Focal Point for Science and Engineering Education is Needed

The Department needs to vigorously develop its university research programs, and the new University Research Initiative, its graduate programs, research instrumentation and facilities modernization programs all need to be strengthened in a coherent and coordinated manner. To do this, we believe that two additional ingredients are needed. The are: (1) clear statutory authority for the Department and the Services to engage in the full range of university activities and (2) a strong organizational focal point in the Office of the Under Secretary for Research and Engineering.

(1) The lack of clear statutory authority to engage in the broad range of necessary university research and education programs, we believe, has inhibited the vigorous development of appropriate initiatives to address the problems I have discussed. The Services and the Office of the Secretary could proceed more confidently with their plans for the universities if they were guided by a fresh expression of Congressional intent and clear statutory authority directing the Department to develop and to carry out the needed university programs. The Congress should provide such authority in unambiguous terms that clearly establish the university initiatives as integral elements of the Department's research mission.

(2) An organizational focal point for the planning and coordination of department-wide efforts in science and engineering education is needed in the Office of the Secretary, probably in the Office of the Under Secretary for Research and Engineering. The Office of the Secretary, the Office of Research and Laboratory Management and the Services have done an admirable job of coordinating the design and planning for the proposed University Research Initiative. As the activities continue to develop, however, it will be important to the success of the long-term effort to have a clear, strong organizational locus for it. We support the following recommendation made originally by the DOD-University Forum.

"A stronger and more clearly identified focal point for engineering and science education policy and programs should be established within the Office of the Secretary. An organization should be charged with primary responsibility for developing and coordinating S&E education and training policy Department-wide, particularly among the Services in all areas of engineering and science education and training."

This focal point, the Forum recommends, should be charged with several responsibilities, including the following:

- develop effective linkages and relationships with other federal agencies, national organizations, states and others,
- develop clear, effective and consistent goals and objectives for DOD science and engineering education programs,
- coordinate the development of new initiatives among the Services and within the Office of the Secretary,
- work with the university community to formulate improved approaches appropriate to Department's needs and mission.

We support this recommendation, and we ask the Committee to direct that such a focal point be established in the Office of the Secretary.

DOD-University Forum

Finally, one of the most effective steps taken in recent years to improve relationships between the Department and the university community was the creation of a new advisory committee to the Department, the DOD-University Forum. The Forum was established two years ago by the Department. The Association of American Universities, the American Council on Education and the National Association of State Universities and Land-Grant Colleges are cosponsors of the Forum. Its purpose is to be a mechanism for sustained discussions between DOD and the heads of the major research universities engaged in DOD-funded research.

The Forum is cochaired by the Under Secretary for Research and Engineering and Dr. Donald Kennedy, President of Stanford University. A list of members is attached (B). Joint DOD-university working groups also have been established in three areas: export controls, engineering and science education and foreign languages and area studies. The Forum is serving its purpose well. The university community looks forward to sustaining the Forum's activities with the next Under Secretary.

Conclusion

In summary, we fully support the important initiatives which the Department has undertaken to rebuild its university research base and to strengthen its relationship with the academic community. Those who have led this effort within the Office of the Secretary and in the Services are to be commended. We applaud their leadership . The university community is willing to work with closely with them to further develop the Department's university initiatives. We ask all of the defense Committees of the Congress to support and strenghthen the Department's proposals.

Mr. Chairman, this concludes my presentation. I will be pleased to respond to your questions.

Attachment A

HIGHLIGHTS

The Forum charged the Working Group to:

- Review DOD needs for S&E manpower and assess DOD S&E education initiatives.
- Examine the deteriorated environment in university S&E departments and assess the effectiveness of DOD efforts to resolve these issues.
- Identify key leverage points where appropriate action could be applied by DOD.
- Assess further DOD support initiatives for S&E education, including one modeled after the prepaid G.I. bill.

Findings

- For the past 10 years Defense has been losing a substantial number of mid-career S&E personnel from DOD laboratories as well as the military.
- Shortages of civilian and military S&E personnel are reasonably well documented; however, qualitative aspects of the problem are not well defined or understood.
- Forecasts by NSF project shortages in the national pool of engineering and technical personnel by 1987 if current trends persist.
- DOD is not taking full advantage of legislative authorization enabling personnel to pursue continuing education opportunities.
- Computer occupations are not adequately reflected either in civilian or military job classifications.
- Work-related training programs for undergraduates are proving to be effective recruitment and retention tools.
- ROTC scholarships are drawing high-caliber S&E officers.
- The quantity of new Defense civilian S&E hires is sufficient, but their quality does not appear to be as good as ROTC.
- The Air Force bonus program for S&E officers is having desired retention results.
- The Army, Navy and Air Force have each initiated fellowship and assistantship programs in Defense related disciplines; program sizes are small but their focus is on quality.
- DOD began a University Research Instrumentation Program in 1983.
- A Summer Faculty Program provides university faculty with research experience at DOD laboratories.
- Deficiencies in research facilities and equipment are acute in most universities.
- Pay differentials are pulling high-caliber graduate students and junior faculty into industry.
- Engineering Ph.D. programs are having difficulty in attracting an adequate number of students with U.S. citizenship.
- The precollege math and science foundation has eroded; there is an acute shortage of high school math and science teachers, the quality of education in these subjects has dropped and the number of high school students enrolling in rigorous math and science courses has declined.

Recommendations

1. Continue existing policies supporting real growth (at 7% per year) in university research.
2. Assess current qualitative aspects of the DOD S&E workforce.
3. Establish a focal point for S&E education in OSD.
4. Strengthen military undergraduate and graduate level S&E education programs.
5. Strengthen civilian precollege, undergraduate and graduate level assistance programs, including creation of a new graduate education program for civilians.
6. Increase opportunities for continuing education among DOD civilian S&E's.
7. Increase interchanges between senior government S&E's and colleagues in industry and academia.
8. Expand DOD graduate fellowship programs to $18 million per year, without altering emphasis on quality.
9. Establish a comprehensive Faculty Development Program.
10. Encourage development of university programs in Defense related technologies.
11. Expand DOD-University Research Instrumentation Program to the level of $100 million per year for at least 5 years; request new appropriations for this effort.
12. Request new appropriations for and establish a University Research Facilities Rehabilitation Program (at $100 million per year for 10 years) targeted on fields of interest to DOD; encourage other agencies to do the same.

EXECUTIVE SUMMARY

In recent years, the nation's security has become increasingly dependent upon maintaining U.S. superiority in broad areas of science and technology; however, this superiority is now being challenged as never before.

Our ability to meet this challenge will depend in large measure on the quality of the engineering and scientific workforce that will make the technological advances of the future.

The needs of the Department of Defense for trained technical personnel, and the current capabilities of the university community for producing an adequate supply of qualified engineers and scientists, is the subject of this report of the DOD-University Forum Working Group on Engineering and Science Education.

Project Tasking

The DOD-University Forum, co-chaired by Dr. Richard DeLauer, Under Secretary of Defense for Research and Engineering, and Dr. Donald Kennedy, President of Stanford University, established the Working Group on Engineering and Science Education in February 1982. Dr. Robert C. Seamans, Jr., Henry R. Luce, Professor of Environment and Public Policy at MIT, and Dr. Lawrence J. Korb, Assistant Secretary of Defense for Manpower, Reserve Affairs and Logistics, were asked to co-chair the Group. Membership was drawn equally from the university community and from DOD.

The Forum asked the Working Group to:

- review DOD needs for scientific and technical manpower, assess present

DOD initiatives to strengthen the Department's engineering and science education activities, note potential deficiencies, and provide consultation and advice as appropriate.

- examine the present "deteriorated" environment in university engineering and science departments, assess the effectiveness of present DOD efforts to resolve these issues, and identify key leverage points in universities and in DOD where action could be applied.

- assess whether a support mechanism, modeled after the prepaid G.I. bill used to attract medical doctors,[1] could be developed appropriately to fill the Department's needs for Ph.D. engineers and scientists; and examine the Department's continuing education programs in the Services to assess whether DOD should increase opportunities for military and civilian personnel to pursue full-time advanced study in universities.

Summary of Findings

A. DOD needs for scientific and technical manpower.

DOD has an important stake in the quality and supply of the national pool of engineers and scientists. Since DOD exerts a substantial influence over the entire system, it has a leadership responsibility to address the current crisis in engineering and science education.

- Of the 2.9 million scientists and engineers in the national workforce, 105,000 or 3.6% are employed by the Department of Defense in a civilian or military capacity. Of these 78,000 are civilians (72% of whom are engineers), and 27,000 are military officers.

- DOD also employs almost 740,000 technicians, 22,000 of whom are civilians. About 715,000 technically qualified individuals are in the military enlisted force and account for 40% of all enlisted personnel. Currently the Services are attracting sufficient numbers of qualified personnel for these positions, but the ability to recruit must be carefully monitored as military manpower requirements increase, the economy improves, and the enrollment of high school students drops.

- Beyond the 105,000 civilian and military engineers and scientists employed by the Department, another 13% of the nation's total S&E workforce is directly linked to Defense programs, budgets and policies.

- Forecasts undertaken by the National Science Foundation project potential shortages (5% to 10%) of electrical and electronic engineers employed by DOD contractors in 1987. Shortages greater than 10% in 1987 are predicted for aeronautical engineers, computer systems analysts and computer programmers.

- The shortages of both civilian and military S&E personnel within the Defense Department are reasonably well documented, but the quality aspects of the problem are not as well defined or understood.

- Experienced, journeyman level (GS-12/13) civilian S&E personnel, who make up the bulk of civilian S&E's in DOD laboratories, are being lost in large numbers. These losses include a small but significant number of exceptionally well qualified personnel. The military has been experiencing a comparable loss with a drop in the number of mid-career S&E officers (O-3, O-4, and O-5) in the last 10 years.

- DOD has not taken full advantage of continuing education opportunities which legislative authorities have provided to send current, full-time civilian and military personnel to graduate programs.

- Although the occupation of computer professional is a readily recognized shortage area, government occupational classifications do not properly identify these skills. As a result, it is not possible to identify requirements, match the supply, or to allow rational hiring, assignment or career planning in these fields.

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[1] The program referred to is the Armed Forces Health Professions Scholarship Program.

B. Assessment of DOD initiatives to meet internal S&E personnel needs.

The Department has undertaken a variety of initiatives to develop the technical personnel it will need in the future. These efforts, however, could be strengthened to maximize potential benefits.

- The Air Force bonus program for officers with critical S&E skills having between 4 and 12 years of service appears to be achieving desired retention results.
- ROTC scholarship programs are providing an increasing number of high-caliber new S&E officers having four-year service commitments.
- Civilian hires of new baccalaureate S&E personnel at GS-5/7 levels are currently in sufficient quantity. However, their quality does not appear to come up to the quality level of ROTC graduates.
- Cooperative education and work-related training programs for undergraduates (such as summer internships) have proven to be a most effective means to enhance recruitment and improve retention. Those involved in such programs have a high rate of conversion to full-time career employment in DOD, and they have been shown to have a good retention rate as well.
- The Defense Authorization Act of 1982 provided DOD laboratories with authority to contract with educational and non-profit institutions for the research services of students. This new authority, coupled with existing co-op education and other work experience programs, could become a highly effective recruitment tool for DOD R&D facilities.

C. Assessment of present "deteriorated" environment in university engineering and science departments and the related precollege foundation.

Research is fundamental to graduate education in engineering and science. Technological knowledge is not a static quantity but is rapidly advancing on many fronts. Engaging in research is an important educational experience. The products of research expand our knowledge and force changes in the engineering and science curricula.

The decline during the 1970's in government support for research at the nation's universities has resulted in a number of problems hampering both research and teaching.

- Deficiencies in research facilities and equipment are acute in most universities. Research instrumentation has grown more sophisticated and research costs have risen sharply while there has been a severe and prolonged erosion in the condition of many university laboratories. As a result, quality research efforts have shifted to a limited number of superior laboratories which have sources of funding enabling them to keep up.
- During the 70's the salaries of Ph.D.'s on university faculties did not keep up with salaries offered to S&E bachelors by private industry. Consequently, the supply of new Ph.D.'s in engineering has dropped considerably in recent years.
- Another consequence of this pay differential has been a luring away of high-caliber graduate students and young faculty out of the universities into challenging, well-paid positions with industry. This has generated a shortage of quality engineering faculty in many universities together with unusually heavy teaching loads. This situation, in turn, has further lessened the attractiveness of a university teaching career for Ph.D.'s interested in research.
- The precollege foundation which supports S&E education in the universities has eroded as the number of high school students enrolling in math and

science courses has dropped and the quality of education they have been receiving at this level has declined.

- Serious shortages now exist in the number of qualified math and science teachers at the high school level, and there has been a general decline in the quality of those who are teaching at this level.

- The deterioration of university research and education has been addressed by both the Senate and House Armed Services Committees, whose members have supported recent DOD initiatives in these areas. (See Appendix D).

D. Assessment of DOD remedial actions currently underway to strengthen engineering and science education.

DOD funding for basic research has been increased in recent years. The present policy of providing 7% real growth will have to be sustained for at least 5 years if university research capabilities are to be fully restored to the level they were in 1965.

- Current budget proposals have been made to allow increases for Defense research (if Congress cuts requests for these funds, as it has done in 16 of the last 20 years, there will be a continuing decline in real DOD investment in university research).

- The Army, Navy and Air Force have begun graduate fellowship and specialized assistantship programs in support of Defense related disciplines.

- In FY 83 DOD initiated a University Research Instrumentation Program. Jointly managed by the Services' research offices, the program is planned for five years at $30 million per year. To establish the program DOD requested an increase in FY 83 Congressional appropriations for the 6.1 research budget of $132 million (or 14% in real growth) over FY 82 funding. Of this amount, $30 million was set aside for the instrumentation program. Final Congressional appropriations, however, reduced the real growth increase in the 6.1 research budget from the requested 14% to 6.7%, of which 4.3% remained earmarked for the instrumentation program. With 4.3%, or almost two-thirds of the increase, earmarked for the instrumentation program, the net real growth in the FY 83 research budget was only 2.4% over FY 82.

- DOD has initiated a new Independant Research and Development (IR&D) policy supported through allowed overhead on DOD and NASA contracts, and designed to enable industrial contractors to support university research.

- There is a limited Summer Faculty Program in operation at DOD laboratories which provides summer research opportunities to university faculty members.

Summary of Recommendations

Based on the foregoing findings the Working Group on Engineering and Science Education makes the following recommendations to the DOD-University Forum:

1. Policies of support for university research should be continued. Any new initiatives should be funded with new appropriations so as not to threaten real growth in the research budget. (See page 41).

2. A study should be made of current qualitative aspects in the DOD S&E workforce. The dimensions of the qualitative problem are relatively unknown and need to be defined and assessed. (See page 41).

3. A focal point for S&E education should be established in OSD. An office should be charged with primary responsibility for developing and coordinating education and training policy Department-wide in all S&E-related areas. (See page 42).

4. Military undergraduate and graduate level S&E education and bonus programs should be continued and strengthened, including ROTC and graduate officer programs at the Air Force Institute of Technology, the Naval Post Graduate School, and civilian colleges and universities. Army and Navy should examine Air Force experience with bonus programs with a view toward considering implementing appropriate initiatives in their own Services. (See page 43).

5. Civilian precollege, undergraduate and graduate level assistance programs should be continued and strengthened. (See page 43). DOD should:

a. Utilize more fully precollege and undergraduate work-experience programs to provide a series of work and learning experiences for young people in DOD research facilities.

b. Increase utilization of financial support authorities now possible with the cooperative education program in order to meet the perceived need for educational assistance for undergraduate S&E students.

c. Establish a new graduate education program for civilians, not limited to current employees, to provide scholarships for experienced S&E personnel to obtain advanced S&E degrees in order to replace those experienced employees at mid-grade that are now being lost to industry and academia. A commensurate service commitment should be required.

d. Request Office of Personnel Management to identify a separate occupational skill code for civilians qualified and working as computer engineers; request higher pay scales for computer scientists similar to those for engineers to enable government to compete with the private sector for these scarce skills.

6. Opportunities for continuing education for civilian S&E's now employed by DOD should be increased. Administrative and legal limitations must be addressed in order to enhance utilization of currently available continuing education opportunities. (See page 45).

7. Interchanges between senior government S&E personnel and their colleagues in industry and academia should be increased. (See Page 47).

8. DOD graduate fellowship programs should be strengthened. Present programs emphasize quality but are very small. Programs should be increased without altering the emphasis on quality. (See page 47).

9. A comprehensive Faculty Development Program should be established. It is recommended that DOD formulate policies and programs to foster faculty development and to stimulate interest among younger faculty in research careers in areas important to the Department. (See page 48).

10. Development of university programs in Defense related technologies should be encouraged. A standing committee of DOD and university representatives should be established to encourage the development of university programs in response to specific Defense needs. (See page 49).

11. The DOD-University Research Instrumentation Program should be strengthened. It is recommended that this program be expanded with new appropriations to a level of $100 million per year and that it be sustained at that level for at least another 5 years. (See page 50).

12. A University Research Facilities Rehabilitation Program should be established. DOD should undertake a research laboratory rehabilitation program targeted on fields of interest to Defense, and encourage other agencies to begin similar programs each in furtherance of their particular interests and missions. (See page 50).

Attachment B

Revised May, 1984

DOD-UNIVERSITY FORUM

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FORMAT FOR INTELLIGENCE MATERIAL

Senator Stevens. I do have some questions. I want to yield first to Sentor McClure, however. I will be right back.

Senator McClure. Thank you very much, Mr. Chairman.

This is an ancillary question. I don't mean to divert attention away from the important points you have made.

The point made to me by a university professor who at one time worked in the field of intelligence was that he is doing much the same work that he used to do when he worked with the CIA which is simply reading available literature published in the Soviet Union, analyzing the contents of economic movements, and evaluating the analysis that other academicians made of similar information and reached conclusions of his own based on that.

Then he is publishing papers and making statements with respect to his findings.

His suggestion was that rather than centralizing all of the debate in opposing groups within the CIA, that we might well as a Nation involve the academic community in that kind of analysis and critique, but have it all in the public arena, open to public view, public discussion and public conclusion.

What would be your attitude about attempting to increase the proportion of that kind of intelligence analysis that is now done wholly within the CIA and trying to externalize some of the information?

Mr. Rosenzweig. I am very supportive of that notion, Senator. As you suggested, as your friend suggested, much intelligence gathering and intelligence analysis consists of the scrutiny of available resources, sources that are available on the public record and don't depend on clandestine and secret inteligence gathering activities.

Much of the work that is done actually in the field is done in universities already. The links between the specialists in universities and the intelligence specialists in the Government are uneven, depending on the particular geographic area under consideration and depending frequently on the accident of associations between specialists in the Government and specialists in universities.

We address through the instrumentality of the DOD University Forum the question of university capacity to do advanced training and research in language, in area studies and in international studies and the connection or the match between those capacities and the needs of the Department of Defense specifically.

We found unmet needs in the Department and unmet opportunities, if you will, in the universities, and the Department has been very supportive so far of efforts to develop programs to help universities improve their language teaching capacity, particularly of rarely taught languages, and to develop their research capacities.

I think there is a great opportunity here for increasing connections that would be much more fruitful for department and other intelligence agencies and for the universities as well.

PRESSURES FROM DEFENSE ACTIVITIES ON CAMPUSES

Senator McClure. Dr. Rosenzweig, let me ask you a question in which I perhaps may be a devil's advocate, but nevertheless has at least been raised in private discussions here and elsewhere.

In the recent past there has been political turmoil about U.S. policies, foreign and defense policies, and universities were under a tremendous amount of pressure from some segments in our society with respect to university involvement, whether it be a ROTC unit on campus, a research grant by the Defense Department or research affiliation with a major weapons supplier.

I think everybody in the academic community is acutely aware of those pressures. We also saw some responses to those pressures by those universities. Let me put it more bluntly.

Universities in some instances removed themselves from such participation because of the political pressures.

Is there a danger to U.S. security posture if we rely too heavily upon universities who in the past have proven unable or unwilling to resist those pressures?

Mr. Rosenzweig. That is a fair question. It is more than a fair question, it is an important question.

My sense of the answer is that if universities are asked to behave in ways that are unnatural or inappropriate for them, then they will be weakened and vulnerable in the face of challenge.

Let me be specific because the one specific way in which universities have in the past been asked to behave that is inappropriate for them is to act in secrecy. I don't think universities do well when they operate in secrecy. I don't think on the whole as a general proposition that classified research ought to be done on university campuses.

There are reasons in terms of the institution why it is bad and to the process of science and teaching an education why it is bad. It also is a form of organization and a constraint that maximizes suspicion and, therefore, hostility.

So, I think when the Government needs, as it frequently does, secrecy as a condition of conduct of research, it ought to go elsewhere than to university campuses to do that. So long as the universities operate openly, acknowledges publicly the nature and source of the support that it is getting and the nature of the work that it is doing, I am quite confident of the strengths of the institutions to protect their members, namely, their faculty and students against politically motivated attacks of the kind you described.

Senator McClure. I understand the point you are making. I guess within certain limits I would agree with the point you make about not being involved in research that is classified, but there is a great deal of margins of classification, in physics, mathematics, optics, laser research, in nuclear research, they are working right on the same horizon where the Government programs work.

I suspect if it were not for some of the defense categories, some of the immense investments that the taxpayers have made in research facilities that are university based would never have been made.

MARGINAL CLASSIFIED MATERIAL

Is there danger in trying to erect an absolute barrier against classified research where so much of it is on the margin?

Mr. **Rosenzweig**. I think not actually. There is no course of action that is risk free, obviously. I think that institutions have developed organizational forms that have enabled them, when lines of research move over the line to a point that ought to be classified, either to move the research over to a separately organized and frequently physically separate, almost always physically separate, facility or to have it simply moved to a different organization altogether.

Senator **McClure**. Are you suggesting then that it is possible to have arrangements in which the peripheral activity is the periphery of the university?

Mr. **Rosenzweig**. Yes.

Senator **McClure**. A separate organization and maybe physically separate?

Mr. **Rosenzweig**. Yes.

Senator **McClure**. But in conjunction with the university and the academic world?

Mr. **Rosenzweig**. Yes, the same people doing the same research.

Senator **McClure**. I understand that distinction. I am thinking of some of the things, basic research and high energy physics. Basic research is not separated from defense. Basic research is not separated from defense programs. They are integrated.

I doubt very, very much if you could of gotten the Congress of the United States so deeply involved in high energy physics with appropriations to universities or university affiliated groups if it weren't for the spinoff effects of knowledge that is applied to defense and some very highly classified.

Mr. **Rosenzweig**. You may very well be right about that. I certainly wouldn't argue the point. I said no course of action is risk free.

One of the reasons we chose as a Nation to support so much basic research in universities rather than separately organized institutions, as is done in many other countries, is because that is where the good people were. There is no point in supporting research, in my view, unless you are supporting the best research. The second best is not worth very much.

The best people during the war were found to be in universities, returned to universities, wanted to be in universities, and, therefore, that is where the work had to be done.

Senator **McClure**. Let me express it in other terms. That other term is that while that academic community greatly strengthens the quality and contributes to the value of the research, it is also equally true, is it not, that the defense expenditures greatly strengthen the quality of academic research?

Mr. **Rosenzweig**. Absolutely.

Senator **McClure**. And, therefore, strengthens the academic community in nondefense application?

Mr. **Rosenzweig**. And in education. There is no question about that at all, yes, sir.

Senator **McClure**. Thank you.

Thank you, Mr. Chairman.

FOREIGN STUDENT PERCENTAGE

Senator **Stevens**. I am interested in the comments in your statement about the percentage of foreign students.

Mr. **Rosenzweig**. Yes, sir.

Senator **Stevens**. And your comment about the $25 million. You indicate that the Department of Defense statement to the Armed Services Committee was not exactly satisfactory as far as you are concerned with regard to the $25 million.

What more would you like to see?

Mr. **Rosenzweig**. Specifically more money, Mr. Chairman, and a greater emphasis on laboratory renovation and modernization than the Department plans include.

Senator **Stevens**. So long as the trend continues to be better than 50 percent of the people getting degrees from American universities taking their new technology back to their country of origin, what incentive is there for us to follow that recommendation?

Mr. **Rosenzweig**. I think we have to do something about that situation, not just look at it and throw up our hands in despair.

What we have to do is provide incentives to good American students who are now being creamed off at the bachelor's degree level and master's degree level to go into industry where the opportunities are financially more lucrative at the moment and give them the incentive and the means to go into Ph.D. programs, that we will develop a sufficient cadre of American born and American citizens in the scientific and engineering communities at the highest levels.

It is not that American students are being kept out of Ph.D. programs so that foreign students can get in. It is simply that they are not interested, they are not applying in sufficient numbers.

Senator **Stevens**. The question has to be raised as to the relevance of the degree in higher degree courses in view of the development in the private sector.

We have 18-year-old computer specialists developing new computer systems for the private sector. Two of the people I have in mind dropped out and did not ever complete their basic undergraduate course and now are, in terms of technology of the area, leading the world and they are not in the business. To them it is the technology area.

Mr. **Rosenzweig**. Really extraordinary talent is hard to fit into any category. Those individuals may be of that quality.

I think as a general proposition, though, there really is no substitute for the kind of development and nurturing of talent that takes place in an advanced degree program and the disciplining of talent to the requirements of research.

Invention is one thing. People have invented throughout history without the benefit of Ph.D. programs. Maybe it is an invention gene that shows up in some people that gives them the ability to think differently from the rest of us.

But for most people the kind of discipline involved in a formal degree program and in the tutelage that a student gets from senior professors in a university in how to do research, how to define a research problem, how to design an experiment, how to evaluate evidence, all of that has to be learned. It does not come naturally.

Senator **Stevens**. Could it be the reverse, that the American university is being driven by a desire to be a part of the world system and try to have an impact on foreign students to the point that many of our American students of great caliber are just not interested?

Mr. **Rosenzweig**. I don't think so.

DROPOUT RATES

Senator **Stevens**. They are dropping out of your system.

Mr. **Rosenzweig**. I don't see any evidence of that. I suppose by hypothesis anything is possible, but I don't see any evidence to support that hypothesis.

Senator **Stevens**. Is there a significant difference between the entrance rate and the rate at which they are graduating?

Mr. **Rosenzweig**. I don't think there is a significant difference.

Senator **Stevens**. Your foreign students are not dropping out. Your foreign students come and stay. Your domestic students are entering and leaving in greater numbers.

Mr. **Rosenzweig**. I don't believe they are entering Ph.D. programs and leaving Ph.D. programs in greater numbers. But I will take a look at that to see if there is any data to support that.

Many of the foreign students, of course, stay in this country; they don't go back home. That is a separate issue. They are not necessarily lost to American industry or science.

Senator **Stevens**. We don't have any relevant statistics on that. Again, we are in a different business here.

I have heard a great number of our colleagues comment on the fact that the higher education in this country is for foreign students and more and more we come across it.

Mr. **Rosenzweig**. In engineering that appears to be the case.

Senator **Stevens**. I think you will find half of the students seeking doctorate degrees in the country are foreign students.

Mr. **Rosenzweig**. I don't think so. I will get some data on that. Those data are available.

I suppose one way of looking at it, Senator Stevens, if we have the luxury of some historical perspective, is to say that for most of our history we were net exporters of students who were trained elsewhere.

In recent years we have become net importers of students who are being trained in this country. Over the long haul that is not perhaps a bad thing since if there is one working international community in this world, it is in the international community of science and learning.

Senator **Stevens**. I understand that. When we are talking about in this subcommittee of trying to increase the American university participation in defense research, in basic research related to defense, we have to take into account how much of that technology that we subsidize with defense dollars leaves this country.

Mr. **Rosenzweig**. I understand that. My answer to that is make it desirable for first-rate American students to enter the kinds of training programs that will make them participants in that enterprise, provide incentives that are counterincentives to the immediate dollars that they can get by taking an entry level job in industry with a bachelor's degree in engineering.

Senator STEVENS. I think we would be interested in suggestions along that line. Unfortunately, it all comes down to increased scholarship money or increased funding in the immediate sense.

Mr. ROSENZWEIG. Increased scholarship money is certainly a part of it.

But also increasing the attractiveness of a research career and that involves making it clear to students when they enter, as they consider alternatives, that if they go into a university-based career, they will have the opportunity to work on the same quality of equipment and instrumentation and in the same kind of modern laboratories that are being made available to them in industry.

At present that is not the case. I think good people look for career opportunities and assurances they are going to be able to operate at the top of their capacities. At present the advantages lie on the side of industry and not on the side of universities and that needs to be addressed.

That is one of the things that the university research initiative is undertaking to do.

Senator STEVENS. I spent an interesting afternoon discussing this with Dr. DeLauer prior to his departure. I think your university community ought to use him as a resource. He is interested in what you are interested in.

We explored at length some of the restrictions we have in terms of classification and security and technology transfers, pursuing what you suggest.

Mr. ROSENZWEIG. I am happy to say we work very closely with Dr. DeLauer. We are extremely sorry to see him leave the Department. We hope his successor is as good as he is and we hope to continue to work with him very closely.

Senator STEVENS. I hope we get his successor's name soon.

Mr. ROSENZWEIG. I will drink to that Mr. Chairman.

Senator STEVENS. We appreciate your testimony. We appreciate your coming back today.

SUBCOMMITTEE RECESS

The subcommittee will stand in recess until 10 a.m. tomorrow when we will receive testimony on the Guard and Reserve.

[Whereupon, at 11:10 a.m., Wednesday, March 27, the subcommittee was recessed, to reconvene at 10 a.m., Thursday, March 28, 1985.]

DEPARTMENT OF DEFENSE APPROPRIATIONS FOR FISCAL YEAR 1986

MONDAY, APRIL 22, 1985

U.S. SENATE,
SUBCOMMITTEE OF THE COMMITTEE ON APPROPRIATIONS,
Washington, DC.

The subcommittee met at 10:10 a.m., in room SD-192, Dirksen Senate Office Building, Hon. Warren Rudman presiding.

Present: Senators Rudman, Proxmire, and Sasser.

NONDEPARTMENTAL WITNESSES

STRATEGIC DEFENSE INITIATIVE

OPENING STATEMENT OF SENATOR RUDMAN

Senator **RUDMAN**. The subcommittee will be in order.

I want to announce that the chairman of the subcommittee, Senator Stevens, was called a while ago for a meeting at the White House and that is why there was a short delay in the hearing getting started. He hopes to get here sometime during the hearing.

We are here today to receive testimony from non-governmental witnesses on the President's Strategic Defense Initiative [SDI]. This is the second in a series of three hearings on the $3.7 billion budget request for SDI for fiscal year 1986.

We agreed to hold an outside witnesses hearing on SDI upon the request of Senator Proxmire and five other minority members of the subcommittee.

Three weeks ago the subcommittee held a classified hearing on the specific programs which encompass what is known as SDI. Tomorrow we will hold an open hearing with Dr. Ikle and General Abrahamson to discuss the policy implications of SDI, its relationship to deterrence and its general economic and industrial impact on the Nation.

INTRODUCTION OF OUTSIDE WITNESSES

Here today before the subcommittee to give their own independent assessment of the Strategic Defense Initiative are Dr. Richard Garwin, Thomas Watson Research Center, IBM Corp.; Ambassador Gerard Smith, the Consultant International Group, and Dr. Sidney Drell, Physics Department, Rockefeller University; Dr. Colin S. Gray, president, National Institute for Public Policy; and Dr. Robert Jastrow, professor of earth sciences, Dartmouth College, the founder of the Goddard Institute for Space Studies.

It has been suggested we hear the first three witnesses as a panel. Dr. Drell, Dr. Garwin and Ambassador Smith, I will ask you to summarize your statements for the committee as they will be put in the record in full. Then we will go to questions.

Senator Proxmire.

Senator **Proxmire**. Thank you very much.

IMPORTANCE OF HEARINGS INTO SDI

Mr. Chairman, I want to commend you and Senator Stevens for calling this hearing and asking these witnesses to appear. It is a very, very distinguished panel we have here this morning. I am delighted with their capability, their quality, which will help the Senate to arrive at a reasonable decision in this very costly and critical area.

The Strategic Defense Initiative the President is calling for is for massive research into ballistic missile defenses. Therefore, it is critical this subcommittee take a long, hard look at the star wars program and solicit as many views as possible in its effort.

I would like to extend my thanks to the panel members who are appearing today who have agreed to come and testify on short notice. I look forward to this testimony. I have a number of questions on these programs.

The administration has requested $2.3 billion which constitutes a 166 percent increase in the star wars budget for the fiscal year 1986. I think by any conceivable measure, that is a staggering increase. The budget we will be likely to be voting on this year will be either no growth for the defense budget or at most 3 percent growth defense budget or at most 3 percent growth.

DOD RESEARCH COSTS

To put it in perspective, the increase the administration is requesting for star wars research is six times higher than the percentage increase being requested for all Department of Defense research.

In future years the Star Wars Program is expected to take an ever bigger proportion of the defense budget. This all means that Congress is going to have to get a better handle on what is being spent on this massive program. We are going to have to roll up our sleeves and examine the priorities in this program and the funding levels.

We are going to have to make hard choices about what we can afford, what we cannot afford and what we don't want in SDI. There is a considerable body of evidence from some of the top defense experts in this country that all we will get out of star wars is the end of arms control and national security.

No matter which way the Congress comes out in the overall desirability of star wars, I think it is crucial we not create a budgetary nightmare in considering funding for this program. The President's vision is not a license to throw money at a star wars program and projects that won't work.

Therefore, I look forward to the testimony of our panelists today. We have a lot of ground to cover. I hope they will give us some insights on what they think our priorities should be in this research effort. Thank you, Mr. Chairman.

INTRODUCTION OF WITNESSES

Senator RUDMAN. Gentlemen, I think what we will try to do with the first panel is to run for about an hour with your statements and questions and the second panel probably half to three quarters of an hour and see if we can wind up around noontime.

If you will identify yourselves for the record any way you wish and proceed as you wish.

As I stated previously, all of your statements will be incorporated in the record in full.

ARMS CONTROL ASSOCIATION

STATEMENT OF AMBASSADOR GERARD SMITH, CHAIRMAN, THE ARMS CONTROL ASSOCIATION

SUPPORT FOR STRONG SDI RESEARCH PROGRAM

Ambassador SMITH. I am Gerard Smith, chairman of the Arms Control Association.

Senator RUDMAN. If you will pull the mike toward you, it will be a lot easier for you.

Ambassador SMITH. I will be very brief. Let me say at the start that I am very much in favor of a strong research program in this field and have been since the ABM Treaty of 1972. The purpose of this, I think, ought to be completely an insurance purpose, a hedge against Soviet breakout from the treaty rather than a preparation on our part to break out from the treaty.

I also think it is essential in order for us to understand our intelligence about Soviet programs to have a very vigorous research program here. But I do not favor the full throttle approach that we see now in the administration's request for funds for fiscal 1986.

It seems to me that until March 1983 we had a bipartisan approach to ballistic missile defense under Nixon, Ford, Carter, and even the first part of the Reagan administration. Now, it seems to me, we are trying to prepare the ground for a breakout and as a lawyer, I would say that constitutes an anticipatory breach of contract.

I think we ought to be aware of the fact that we are already paying a price for being so cavalier about a solemn treaty.

SDI PROGRAM COSTS

On the subject of funds, I am sure you are all thinking ahead to the full cost of this program, not just the $26 billion that we are told it will cost over the first 5 years. That is not going to complete even the research and development phase.

I have heard a figure that says 10 years is a better estimate as to what it is going to take and perhaps $70 billion as to what it is going to cost. Now, if the SDI gives real solemn promise of leading to the President's dream of elimination of nuclear weapons, I think it would be a bargain even if it cost $1 trillion that we have heard speculated about.

But if it is going to lead at best to some increase in our deterrent forces, then I would question whether there are not better ways to spend the projected immense resources we are talking about now.

We tend to foreget that in talking about increasing American defenses that we are also talking about increasing Soviet defenses because if the treaty is abandoned, which it will have to be, that means we are going to unleash the Soviets. They are doing a lot of work in this field, but I am convinced they are going to move much faster once the treaty is abandoned.

So, I will say until we have a better idea of where the SDI is supposed to take us, whether to the millennium, elimination of nuclear weapons, or just to make some more effective deterrent to deter war, it would be prudent to take a more measured, less reckless pace in trying to develop hardware for this purpose which is to us yet unclear, especially at a time when we are facing a major threat to our national security in the form of our budget deficits.

I would ask, is it really necessary to push technology at the proposed pace for a defense system which cannot be deployed during the lifetime of many of our current political leaders?

SOVIET LEAD IN SDI TECHNOLOGY

Now, I know that alarms have been raised that the Soviets have a lead now in defense technology, a belief which is apparently not shared by General Abrahamson who is in charge of this project. He is reported as having said last year in the key technologies needed for a broader defense such as data processing and some computer software, we are far, far ahead.

But even if you assume that the Soviets have some lead, a lead of several years, is that really significant at a time when we are both still only researching systems that probably cannot be deployed for 15 or 20 years?

I would stress that the situation in no way resembles that of the wartime when we were afraid the Germans were going to anticipate us in the production of an atomic bomb.

It might be well to recall that even under those terse conditions the total cost of the atom bomb research and development and production involving a vast industrial plant, cost in 1984 dollars $15 billion, less than the administration is proposing to spend for research on SDI over several years in this preliminary phase.

SDI AS INSURANCE

We are told that SDI is just prudent insurance against Soviet breakout from the treaty, but that was not the rationale given for the new defense strategy in March 1983. It could not have been in the minds of those individuals who first called this an initiative, not a reaction, but an initiative, strategic defense initiative.

At the very least should we not defer certain programs because of the mischief they are working with prospects for achieving essential arms control goals? For example, demonstrations in technologies which in spite of the rationalization of the administration, I am persuaded will violate the ABM Treaty, or programs which rely on ambiguities in that treaty.

I think the burden of proof should rest on those who hold that the benefits from these ambiguous programs will clearly exceed the potential damage to the United States if the ABM Treaty is terminated.

Perhaps one should explore the President's dream to the utmost to render ballistic missiles obsolete and impotent and after passage of a tricky transition period lead to the ultimate elimination of all nuclear weapons, but no one knows how to do that now nor how to get the indispensable Soviet cooperation in order to maintain strategic stability until the end goal is reached.

But does a preliminary quest to see if such defenses are technically possible really require expenditures of $30 or $40 or $70 billion?

In the light of some 30 years of experience in working on national security matters in and out of Government, I conclude that pursuing the SDI at the proposed pace can only prejudice the possibilities for the Geneva talks. There we are working to regulate and control strategic offensive nuclear arms.

SDI is proceeding on the declared assumption that strategic defensive weapons should and will be deregulated and decontrolled. We can't have both.

Mr. Chairman, I have studied S. 879, proposing an alternate strategic defense initiative budget for fiscal 1986 and it strikes me as a much sounder approach to the insurance program which the administration says it is now following. Thank you.

STANFORD UNIVERSITY

STATEMENT OF MR. SIDNEY DRELL, STANFORD LINEAR ACCELERATOR CENTER, STANFORD UNIVERSITY

ALTERNATIVE APPROACHES TO SDI

Mr. **DRELL**. Thank you, Mr. Chairman for this opportunity to testify.

I would like to enclose with my testimony for the record a report that we have just finished at Stanford which looked into the near term prospects for alternative approaches to strategic defense. It represents the consensus of its signatories who brought a very broad range of views and experience to our workshop on a limited set of high priority objectives and activities in strategic defense.

Some of the authors best known include Dr. John Foster, former director of defense for research and engineering; Ambassador Graybeal, ambassador to the Standing Consultative Commission when it was created, other experts, including Dr. Garwin on my right.

OBJECTIVES FOR R&D PROGRAM

We proceeded by identifying the five objectives for an R&D program in strategic defense:

To discourage the Soviet Union from a breakout in defensive weapons;

To minimize the adverse effects of a Soviet ABM breakout;

To protect against military or technological surprises harmful to our security;

To identify areas of technology or development which should be deemphasized or terminated as not promising and as wasteful;

And finally to provide options for limited stabilizing defenses. The most obvious possibility here is to maintain the option of terminal defense of our ICBM fields.

PROBLEMS FACING STRATEGIC DEFENSE SYSTEMS

The requirements for an effective military system obviously go far beyond demonstrating the technical feasibility of its components. The system faces major challenges of integration and reliability, to say nothing of coping with countermeasures.

These are very severe problems, particularly so when we are dealing with a system that is so complex with such enormous data handling requirements and with such tight engineering tolerances with such shorttime intervals for operation and which require the remarkably high reliability that strategic defense requires.

The first task in examining the means to accomplish the strategic missile defense is to identify the critical technologies and to determine what levels of performance would be required in each application to an operating system.

Our workshop, with its broad range of experience and views, by the way, from supporters to opponents of SDI, our workshop concluded that it is now far too early for any program in strategic defense to consider technology demonstrations of types that could raise serious issues of compliance with the ABM Treaty. Almost all of those new technologies that do appear to be ready for such demonstrations can be tested within treaty provisions.

Field testing, however, of some of the more difficult ones, such as directed energy weapons systems themselves, upon which the various proposed defenses would rely, would clearly be forbidden by the treaty.

Since these technologies still require many orders of magnitude of development before they can meet minimum systems criteria, it would be foolish to plan field demonstrations in the near future, foolish from the point of view of arms control compliance, foolish from the point of view of running a well-directed, coherent, and productive R&D program.

CATEGORIES OF TECHNICAL REQUIREMENTS OF SDI

At this time we conclude that demonstrations should not even be considered of the type that would threaten the ABM Treaty. When we considered the technology, the technical requirements of the system, we divided the work into three categories and I just want to make a brief comment about each one of these three categories.

The first is the so-called traditional ballistic missile defense, that is fixed ground-based nuclear armed interceptor rockets and radars which were envisaged originally in the ABM Treaty signed in 1972.

This technology is currently the only candidate system for strategic defense which is based upon tested integration of proven systems components. Thus an option to deploy or threaten deployment of such a system, even of limited capability, must occupy a central role in any strategic defense planning.

This means maintaining at Kwajalein a test facility for a traditional type of terminal defense system with evolving technology. This is permitted under the ABM Treaty provisions.

PENETRATION AIDS

One of its important aspects is that a critical U.S. element for responding to a potential Soviet breakout would be penetration aids and such a system would be required for testing our Penetration Aid Program.

We do not recommend in our workshop reopening negotiations to change the ABM Treaty to allow deployment of such a system, but we do strongly recommend developing a prototype within treaty limits.

I disagree strongly with the downgrading of this type of traditional or conventional BMD with nuclear warheads relative to the strong emphasis by the SDI Program or the much more difficult and far out technology of nonnuclear warheads which requires projectiles to hit directly the incoming warhead, not just come near it and explode the warhead.

DIRECTED ENERGY

Second, directed energy; this category includes laser technology, X-ray lasers and exotic concepts. There is a lot of debate about how large a constellation of lasers would be needed in space. It is perhaps the most controversial recommendation of our workshop, with its disparate group of signatories to eliminate chemical infrared lasers from consideration as ballistic missile defense weapons.

These lasers have been proposed for predeployment in space to accomplish boost phase kill of ICBM's. Such deployment has disadvantages, the need for costly redundancy in order to maintain laser satellites on station at all times, the high cost of vast energy storage in space and, above all, the vulnerability of such battle stations to direct attack by a number of means at highly favorable cost exchange ratios to offense.

These factors we believe make such a concept impractical, and work on lasers in our recommendation should concentrate on increasing the capabilities for ground-based visible and ultraviolet rays.

X-ray lasers pumped by nuclear explosives should continue to be supported within treaty limits. It is an area about which we know very little, an area in which the Soviets are doing work in a robust research program. We recommend research continue on them.

SUPPORTING TECHNOLOGIES

In the third category let me mention two technologies. This third category is the one which we call supporting technologies in my written statement. It is the technology, that is, the advanced technical aspects of an R&D program which deals with the necessary components which must be put together to form a system.

Let me mention two important tasks in this category which we feel must be supported strongly.

One is research on midcourse discrimination technology and the effect of nuclear weapons. There are many means by which one can kill objects in space. The problem is how do you distinguish warheads from decoys above the atmosphere particularly in a nuclear disturbed environment?

Furthermore, we should improve our warning and acquisition sensors, independent of whether one goes ahead with ballistic missile defense. Early warning and good surveillance in space are in the national interest. Also we must protect our satellites from direct attack as well. Space survivability of components has to be studied and understood in terms of the implications for ASAT policy.

There are other important issues, such as battle management. We found in our review that the requirements for battle management of a system for nationwide defense are so staggering they can only be described as revolutionary. Cleary we have far to go there.

POLICY ASPECTS OF STRATEGIC DEFENSE

There are policy aspects of strategic defense that we have to study because we know nothing, or let me say we have inadequate understanding of them right now. For example, How would one make the transition from today's world to defense dominance?

If, in fact, the strategic defense system effective enough to establish such a concept of defense dominance were developed, is there a stable strategy for deploying it, one which does not lead to a high risk of inciting a nuclear strike during transition period?

How high a degree of automation are we willing to accept when we consider that particularly for boost phase, the essential elements of a nationwide defense would have to be run essentially by computers?

Finally, coming to point of numbers, the opportunity cost we found for this research program which we have supported in this study is quite low since the total cost is not likely to be very difficult from the sum of amounts which were spent on its various components in the recent past.

In those words, I am using the words of the consensus of the study, not just my own words.

PROPOSED R&D PROGRAM

The R&D Program we propose is specified to be fully consistent with the provisions of the ABM Treaty and poses no threat to the Soviet deterrent forces or to the fundamental basis of the United States-Soviet strategic relationship. The Soviet Union is already carrying out similar broad defensive R&D work and, in contrast to the United States has indeed prototyped a traditional or conventional terminal BMD defense of the type that the SDI Program is in fact abandoning.

A deliberately paced United States research effort on strategic defense that is organized and prosecuted with clearly stated goals and means that abide by the ABM Treaty should serve our security well at reasonable cost, very low opportunity cost, and should give the U.S.S.R. no reason to feel the need for additional offensive or defensive forces.

In concluding, summarizing my personal views, I would, like Ambassador Smith, have great doubts, based both on technical and strategic grounds, that significant acceleration or expansion of ABM research and development is warranted or prudent.

Deliberation and restraint, not simply because of the enormous cost involved, but because the strict limitation of ABM deployment in the Soviet Union as well as the United States, is one of the few points of real agreement reached in the United States-Soviet dialog.

This agreement has consequences I believe that are of great importance to the effectiveness of our deterrent, for the very fragile strategic stability that currently exists, for the coherence of the alliance, and for our hopes in negotiating a reduction in offensive forces and avoiding nuclear war.

We do not know, even conceptually, how to build a strategic defense for our society that can render nuclear weapons important and obsolete as called for by the President, nor do we perceive how to get there without severe arms limitations.

RESEARCH ON STRATEGIC DEFENSE NECESSARY

I agree with Paul Nitze's statement to the Philadelphia World Affairs Council on February 20 in which he said for the near term we should pursue research on strategic defense in full compliance with the ABM Treaty.

Before even considering moving ahead for deployment of ABM, we must make certain that the new technologies meet two demanding criteria for effective defenses that Nitze put down. The technologies must produce defensive systems that are survivable and that are cost effective at the margin.

No ABM system concept in the past came close to meeting those two critical cirteria and I know of no analysis supporting claims that a future one will fare better.

As Mr. Nitze also emphasized, a transition period in which both offensive and defensive weapons were deployed would be, in is words, tricky and would require Soviet cooperation, with arms control playing a critical role.

Therefore, I recommend that:

We reaffirm our commitment to the ABM Treaty.

Organize and support a prudent, deliberate, and high quality research program on defensive technology within the treaty provisions as outlined in this workshop report.

Recognize that at the present primitive state of many of the new technologies it is far too early for us to undertake the large technology demonstrations which would be politically mischievous regarding treaty compliance as well as technologically unwarranted and obviously have a major budget implication.

Fourth, we should have a strong team of devil's advocates, a so-called Red Team, to challenge the defense program concept against potential Soviet countermeasures. These are the essence of the problem. It is not technology. It is operational problems against countermeasures by a determined opponent that have to be thoroughly studied.

Fifth, there should be a senior level independent oversight panel as recommended by the workshop and which I endorse very strongly, created by the Congress. This panel should ensure that the work remains in close harmony with our overall strategic missile and arms control goals and policy.

Finally, Congress, I hope, will enact legislation in support of the research program with the explicit provision that the research and technology program proceed by means fully consistent with the ABM Treaty.

SDI RESEARCH FUNDING PROPOSAL

The legislative record must make clear that this program in no way indicated a change in U.S. strategic policy. I believe an appropriation of roughly $2 billion per year, a more than 30-percent increase in the research budget, is more than adequate for a strong research program along the outline that I have described in this workshop study.

We all have to realize the path to a safer world won't be paved by technology alone. We have been down that path before. It will have to be paved initially and for a large part of the way by progress in diplomacy and arms control. Strategic defense can aid our guest for a safer world only if it is pursued within an arms control framework that limits further weapon buildup and countermeasures.

Thank you, Mr. Chairman.

[The statement of Mr. Drell follows:]

TESTIMONY ON THE STRATEGIC DEFENSE INITIATIVE

by

SIDNEY D. DRELL

before

THE DEFENSE SUBCOMMITTEE

of

THE SENATE APPROPRIATIONS COMMITTEE

April 22, 1985

Thank you for this opportunity to testify on the Strategic Defense Initiative. First I will present the conclusions of a recently completed report of the Stanford University Center for International Security and Arms Control which analyzed what the United States should be doing in strategic defense during the next decade. I will then add some personal views based on my experience in this field on technical issues and as a continuing adviser to agencies of the U.S. Government for more than twenty-five years. (My curriculum vitae is appended to my testimony.) My statement to the Committee represents only my personal views and not those of any organization.

The Stanford report examines near-term prospects for, and alternative approaches to, strategic defense. It represents the consensus of its signatories, who brought a very broad range of views and experience to the workshop, on a limited set of high-priority objectives and activities in strategic defense.[*] It asserts five objectives for the R&D on defensive weapons during the coming decade:

1. *Discourage the U.S.S.R. from a "breakout" in defensive weapons.*

   Advanced U.S. technology and the real possibility of American countermeasures, possibly including a defensive deployment in response, could contribute to deterring the Soviets from Treaty withdrawal or rapid breakout.

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[*] "Strategic Missile Defense: Necessities, Prospects and Dangers in the Near Term" (Sidney D. Drell and Thomas Johnson, co-Chairmen; John A. Ernest, Philip A. Farley, John S. Foster, Jr., Richard L. Garwin, Sidney N. Graybeal, John W. Lewis, Wolfgang K. H. Panofsky, Theodore A. Postol, Condoleezza Rice, Malvin A. Ruderman, and George C. Smith) April 1985

2. *Minimize the adverse effects of a Soviet ABM breakout.*

   We can rapidly adopt responsive measures if we identify and prepare now, to the extent warranted by the military effectiveness of various possible Soviet breakouts, the most cost-effective means of dealing with a breakout. The means might or might not include an American deployment of extensive defensive weaponry; they would certainly include countermeasures by our offensive forces to maintain their deterrent effectiveness and to defeat the Soviet defenses.

3. *Protect against military or technological surprises harmful to our security.*

   This can only be accomplished by maintaining our own healthy R&D enterprise in the relevant areas. It is vital for us to maintain a high capability to identify and evaluate Soviet BMD activities and technological improvements, in particular, so as neither to underestimate nor exaggerate Soviet progress in defense technology.

4. *Identify areas of technology or development which should be de-emphasized or terminated.*

   We will certainly find in the course of research and development that certain system concepts, or the entire technological approach on which they are based, have little eventual utility, either because they turn out not to be feasible at requisite scale; because they cannot achieve system effectiveness or cost effectiveness criteria; because they are too vulnerable or otherwise too easily countermeasured; because they have adverse ramifications (for example, they are politically or militarily destabilizing); or because there are better alternative security approaches. We may also wish to cancel or at least defer programs in certain areas because of the mischief those programs work with prospects for achieving essential goals in arms control. An immediate area of concern in this category would be demonstrations of technologies which violate the ABM Treaty or which rely upon and hence pejoratively stress ambiguities in compliance with Treaty provisions. A case for going ahead with any such demonstrations would have to be made by establishing that their benefits clearly exceeded the potential damage to our national security that could follow withdrawing from the ABM Treaty.

5. *Provide options for limited stabilizing defenses.*

   It remains possible that the United States may wish to deploy limited strategic defenses for specific purposes in the future, either within the limitations of the existing ABM Treaty or by attempting to renegotiate with the U.S.S.R. some few modifications of the specific limitations. The most obvious possibility in this category is terminal defense of hardened ICBM silos and launch control facilities against ballistic missile reentry vehicles. Research will enable the US to assess the potential value of such deployments, and development of functional prototypes will enable the US to move ahead expeditiously if cost-effective options have been found and if national needs have been established.

The workshop report emphasizes the importance of designing and executing the defensive weapon R&D program in ways (within the ABM Treaty) that maintain the range of technological options without, directly or de facto, committing the US to developing or deploying systems which could be destabilizing and hence harmful to our national security. Neither must it give rise to the presumption that the US is committing itself to a defensive weapons breakout.

The requirements for an effective military system obviously go far beyond demonstrations of the technical feasibility of its components. The system faces major challenges of integration and reliability, to say nothing of coping with countermeasures, even primitive countermeasures (that is, those which the adversary can employ with little lead-time and with no major changes in his own arsenal, simply by changing his tactics). With strategic defense weapons systems, integration and reliability are particularly pressing questions because the systems tend to be highly complex, the data-handling requirements enormous, the engineering tolerances very small, the time intervals extremely short, and the reliability required remarkably high.

The first task in examining means to accomplish strategic missile defense is to identify the critical technologies that would be required to implement various candidate systems concepts and to determine what levels of performance would be required in each application. The workshop concluded that it is now far too early for any program in strategic defense to consider technology demonstrations of types that could raise serious issues of compliance with the ABM Treaty. Almost all of those few technologies that do appear to be ready for such demonstrations can be tested within Treaty provisions. Field testing of some more difficult technologies, such as directed energy weapons systems, upon which various proposed defenses would rely, would clearly be forbidden. Since these technologies still require many orders of magnitude of development before they could meet minimum system criteria, it would be foolish to plan field demonstrations of them in the near future. In addition to the political costs of such early demonstrations (whether of not they violate the ABM Treaty), premature promotion to the demonstration-and-test phase can be very harmful to attainment of any particular goal in strategic defense. A considerable body of evidence has shown that early demonstrations of new technologies have two deleterious effects: First, they tend to freeze the technology being demonstrated before it is fully mature, and thus guarantee less than full capability. Second, they tend to absorb money from the associated R&D program (because of cost overruns), and thus eliminate the possibility of better solutions. In a problem such as boost-phase defense, in which the most promising technologies have the farthest to go, this means that early demonstrations may effectively eliminate any chance of success. Thus, at this time, sensible R&D should proceed; but demonstrations (in space or against targets) of types that could justify charges of ABM Treaty violation should not even be considered.

We considered work in three categories: (1) So-called "conventional" or "traditional" ballistic missile defense, which we take to mean the ground-based nuclear-armed interceptor rockets and radars originally envisioned and considered explicitly by the ABM Treaty; (2) Directed Energy, that is laser and particle beam weapons; and (3) Supporting Technologies, those which are necessary for advanced system integration and for support of missions closely related to BMD.

hard-site defense to address the problem of ICBM vulnerability. In such a case, the only way, based upon what we are now capable of both technologically and militarily, that such an option would be available to the United States would be through a conventional BMD system.

Of course, such a deployment, if it were concluded to be strategically advantageous, would require renegotiating some terms of the ABM Treaty - at least the provisions governing numbers of interceptors and radars, and probably mobility and deception as well. However, two important technical issues would certainly have to be settled before any change to the ABM Treaty could be considered to be an attractive policy option: guaranteeing that hard-site deployments could be unambiguously defined and verified as hard-site and not area defenses and demonstrating that the hard-side defense enjoyed a strong, favorable cost-effectiveness ratio against increases in numbers of Soviet reentry vehicles (RVs) and in their penetration capabilities. I also believe that explicit prohibitions on increases in offensive weapons would be necessary. It was explicitly not a workshop recommendation to consider reopening negotiations on the ABM Treaty.

In this category of conventional BMD the workshop also recommends a vigorous resuscitation of the penetration-aids program, treaty compliant advanced technology developments, and continuing R&D on "simple-novel" defense concepts - including the so-called "dust defense" in which buried nuclear explosives cast up large quantities of fragmented rock in the paths of incoming RVs.

A future systems concept which has received considerable attention lately is known variously as non-nuclear kill (NNK) or kinetic energy weapons (KEW); generically both these terms mean projectiles which home on RVs and strike them. This hit-to-kill approach has been proposed for systems in the atmosphere and has actually begun testing for mid-course intercept in space (the Homing Overlay Experiment). Performance requirements for terminal, or endoatmospheric, NNK are considerably more stressing than those of conventional nuclear systems in the same engagement areas; it requires terminal homing and faces the funda-

Here is a description of the work we recommend in each of these three categories:

Conventional Ballistic Missile Defense

Conventional BMD is currently the only candidate system of strategic defense which is based upon tested integration of proven system components. Thus, an option to deploy or to threaten deployment of such a system, even of limited capability, must occupy a central role in any strategic defense planning.

The principal goals of work in this category are (a) to develop and maintain on an R&D basis an evolving, state-of-art conventional system; and (b) to develop and test penetration aids against that system to maintain the effectiveness of the U.S. offensive deterrent. These two goals must be addressed as a joint effort. Together, they represent one of the major recommendations of the Stanford workshop: development and operation at Kwajalein Island of a test facility incorporating a single integrated but evolving conventional terminal defense system (a "functional prototype"), and advanced offensive penetration aids (pen-aids). Within certain broad limits, the provisions of the ABM Treaty permit development and testing of such fixed, land-based systems components. Development of a functionally prototyped system of interceptors, radars, computers, and communications- within Treaty limits - will contribute to meeting the first objective of strengthening the incentive to ABM Treaty compliance since the Soviets have been very active in this area. Of primary importance it will contribute to the second objective of minimizing the adverse effects of a Soviet breakout. The critical element of a U.S. response to a Soviet breakout is deployment of penetration aids on ballistic missiles. But a program to develop and modernize penetration aids cannot provide confidence without a working and modernized BMD test facility against which to test them.

Finally, the availability of a capability for terminal defense meets the fifth objective of providing options for limited, stabilizing defense. For example, the U.S. and the Soviet Union might decide jointly in the future to permit expanded mental difficulty of requiring discrimination at higher altitudes. Hence, it does not qualify in the "simple-novel" category.

I disagree with the downgrading of conventional BMD with nuclear warheads relative to the emphasis being put by the current SDI program on this much more difficult and far-out technology.

Directed Energy

This category includes laser technology, x-ray lasers, and exotic concepts.

Research on directed energy killers is essential to protection against technological surprises and can contribute to deterrence of a Soviet breakout. Directed energy sensors and discrimination techniques may also eventually contribute to minimizing the impact of a Soviet breakout and to providing for stabilizing defenses. Of course, directed energy R&D must also meet the fourth objective - identifying technologies with insufficient capabilities.

Perhaps the most controversial of the workshop's choices is to eliminate infrared (IR) lasers from consideration as BMD weapons. Chemical IR lasers have been proposed for pre-deployment in space to accomplish boost-phase kill of ICBMs. Such deployment would add a number of considerable disadvantages: the need for very costly redundancy in order to maintain laser satellites on station at all times; the high cost of vast energy stores in space; and, above all, the vulnerability to direct attack by a number of means at highly favorable cost exchange ratios to the offense. The workshop concluded that these factors make such laser battle stations in space completely impractical. Hence, for laser weaponry, our recommendation is to concentrate work on increasing the capabilities of ultraviolet (UV)/visible lasers, particularly ground based.

Nuclear-driven x-ray lasers present a defensive weapons technology with some potential for employment in support of offensive operations as well. Currently there is very great uncertainty in performance levels that can be reached or maintained against countermeasures. If the moderately high brightness levels which have been discussed publicly are achieved, x-ray lasers could be used as ASAT weapons; it is possible that they might be integrated into offensive weapons systems for suppression of retaliatory ICBM launches following a first strike. If very high brightness levels are achieved, x-ray lasers could be the basis of a potentially effective defensive layer. Since the U.S.S.R. is, virtually certainly, also conducting R&D in this area, the U.S. has a strong incentive to understand what performance levels are actually achievable. Consequently, a robust research program within Treaty limits is recommended here as well.

Exotic concepts include particle beam weapons, decoy discrimination techniques which employ particle-beam weapons, and free election lasers which are still quite early in their demonstrated performance and well behind lasers. As is appropriate for the high-risk component of any research program, such concepts should be allocated about 5-10 percent of the total funds devoted to directed energy.

Supporting Technologies

The workshop identified six tasks in this category:

1. *Mid-course discrimination technology and nuclear weapons effect research*

   There are several means, including nuclear weapons in various deployment modes and non-nuclear hit-to-kill projectiles (such as the one tested in the Homing Overlay Experiment), by which the defense might kill RVs in mid-course. Most of these means seem potentially reasonable as components of military systems, provided their targets can be uniquely identified. But no one has yet solved the original problem which plagued the Nike Zeus project in the late 1950's, how to tell the real RVs from decoys and sensor noise. We should be conducting a broadly-based R&D program to evaluate plausible mid-course discrimination techniques.

   It is also necessary to find a reasonable way to simulate and analyze the effects of an environment containing multiple nuclear weapon detonations. Our ability to predict the effects of high-altitude nuclear weapons effects is currently insufficient to permit confident assessment of the performance of virtually any BMD system. We strongly recommend that this area of research be resuscitated in support of both discrimination R&D and pen-aid development.

2. *Improvements in warning and acquisition sensors*

The array of radar and/or optical sensors on which the defense relies for immediate warning of an attack and a quick analysis of the size of the threat (attack assessment) must be accurate and highly reliable. Independent of defensive weapon programs, a constant improvement of sensor quality and survivability is vital and should be a matter of extremely high priority. We should do what we can to protect our satellites from direct attack and to harden them against long-range nuclear weapons effects, and we should proliferate them.

3. *Space Survivability*

An understanding of space survivability issues will, of course, be critical to understanding the feasibility of many advanced defensive weapon systems and to understanding possible threats to intelligence, warning, and communications systems. Two specific possibilities must be addressed within the framework of such an effort: space mines and antisatellite (ASAT) systems.

Spacemines - long-lived satellites containing either conventional or nuclear explosives which can maneuver within range of other satellites to kill them - provide a simple, inexpensive response to hostile deployment of space-based weaponry. They should be studied carefully, particularly as responses to space-based BMD, with technical and systems issues being clearly defined and bounded and with the ramifications of deployment in various arms-control scenarios well delineated.

With regard to the relationship between ASAT and BMD, there are two cases, the converse of one another: the effect of ASAT R&D upon BMD technology evolution and the effect of BMD R&D upon ASAT technology evolution. In the latter case, the workshop agreed: any comprehensive program of R&D for area defenses will also be addressing most of the critical issues in ASAT development. In simple terms, an exoatmospheric BMD capability implies an ASAT capability; since BMD is a much more difficult task, partially effective missile defenses may prove to be very effective low altitude ASATs. As to the former case, however, we have not arrived at a consensus view.

The extent to which R&D on and any deployments of ASAT weapons and BMD are actually coupled must be examined further and clarified. Because of the linkage between ASAT and BMD, the interactions between arms control efforts and weapons development contain many areas still open to conjecture, particularly those relating to verification.

4 *Fast-burn boosters*

Should the product of Soviet space defense research become capable of engaging U.S ICBMs in boost-phase or mid-course, the U.S. should be prepared to respond with appropriate and timely countermeasures. A potentially straightforward countermeasure to a great variety of boost-phase attacks could be the employment of fast-burn boosters. Because their fuel burns out so rapidly and at altitudes which are quite low relative to today's boosters, such boosters could become very difficult to engage during their boost phases. Additional denial of engagement capability might also be achieved by more rapid deployment of RVs and decoys from the missile immediately following the boost phase. Consequently, we recommend a modest development program to evaluate fast-burn boosters and rapid RV deployments. This work will also allow evaluation of the effectiveness of such a Soviet countermeasure to boost-phase defenses we might be interested in.

5. *Battle management*

Any large and complex defensive system will need to be able to acquire and handle enormous amounts of data from sensors, to analyze the data rapidly, and to commit the appropriate system components to the engagement. This demanding set of data-handling and logic tasks is referred to as "battle management." A multi-tiered nationwide defense will require improvements in technologies needed for battle management so great as to be appropriately characterized as revolutionary. A moderately-sized program to define requirements and to develop both hardware and software for the challenging control problem is clearly required.

6. *Aircraft and cruise missile defense*

   The U.S. should expand studies into the feasibility and desirability of installing defenses against air-breathing weapons because the technological prospects have been changing rapidly. This work is needed as a matter of balance. Otherwise, if the U.S. were actually to succeed in providing nationwide ICBM defense, it would be in the embarrassing position of having a defense against the currently most numerous and threatening carriers of nuclear weapons but no defense at all against the others.

Further Studies

The workshop also identified four important policy aspects of strategic defense which require further intensive study:

1. *Transition to defense dominance*

   If, in fact, a strategic defense system effective enough to establish defense dominance is developed, is there a stable strategy for deploying it - one which does not lead to a high risk of inciting a nuclear strike during the transition period?

2. *First-strike adjunct*

   Does an effective or partially effective area defense inevitably create a potential first strike capability through ability to suppress retaliation?

3. *Automation*

   How high a degree of automation will be required of the prospective strategic defense? What precisely are the acceptable limits of automation? This issue is particularly pressing for boost-phase defenses.

4. *Allied deterrents*

   Our allies have expressed fears that U.S. and Soviet nationwide defenses would undermine the effectiveness of their own deterrents and the validity of NATO strategy, perhaps leading to a decoupling of Europe as a conflict zone. To what extent are these fears justified? Can any such effects be mitigated?

Vitality and Responsiveness

A program proceeding from research to development can and will remain vital and responsive to its objectives only if it is continually challenged to do so. Too often in such programs the necessity of demonstrating favorable cost-exchange ratios against opponents is forgotten or conveniently kept well in the future.

To prevent this, we suggest the establishment of two critical advisory bodies. The first is a Red Team to provide the offense analysis and countermeasures and to evaluate its own cost effectiveness in defeating the defense. This Red Team should have a charge independent of the management of defensive weapons R&D. A close connection should be established between the Red Team and the intelligence agencies, to their mutual benefit. The Red Team will thus receive more realistic and detailed accounts of Soviet capabilities; the intelligence community will be assisted in focussing its efforts on our needs for intelligence on what the U.S.S.R. is doing both in defensive and offensive countermeasures.

The second suggestion is the constitution of a senior-level, independent oversight panel which examines work on defensive R&D and reports at a very high level in the Administration. The panel should comprise both experts in the various technological and military specialties and former public officials in defense and arms control matters. This panel should maintain knowledge of the technical and programmatic status of work on defensive weapons that is sufficiently detailed for the panel to advise the government on the setting of priorities. It should also conduct periodic reviews of the R&D to ensure that the work remains in close harmony with U.S. overall strategic (both military and arms control) goals and policies.

Ramifications

The opportunity cost of the work recommended by the workshop is quite low, since its total cost is not likely to be very different from the sum of amounts which were spent on its various components in the recent past.

The R&D proposed here is specified to be fully consistent with the provisions of the ABM Treaty and so poses no threat to the Soviet deterrent forces or to the fundamental basis of the U.S.- Soviet strategic relationship. The U.S.S.R. is already carrying out similar broad advanced defensive R&D and, in contrast with the U.S., is actually engaged in prototyping and deploying conventional terminal BMD defenses. A deliberately paced U.S. research effort on strategic defense that is organized and prosecuted with clearly stated goals and means, and that abides by the ABM Treaty, should serve our security well at reasonable cost and should give the U.S.S.R. no reason to feel the need for additional offensive or defensive forces. Apart from real incentives, incentives which arise entirely from fears and perceptions must be dealt with. A U.S. effort with proper planning, explanation, and diplomacy should not create a problem of Soviet perceptions vis-a-vis strategic or arms control stability.

The impact of such clearly defined and constrained activities on the ABM Treaty should be nil in the near and mid-terms. Success in persuasively creating a new approach to effective national defense would indeed present a challenge to the Treaty. If this should occur, it would do so well into the future, and regardless of which side succeeded. In such an eventuality, we should have to resolve and negotiate a new arms control policy, one that would successfully integrate offensive and defensive forces.

Conclusion

To summarize my personal views, I have grave doubts, both on technical and strategic grounds, that significant acceleration or expansion of ABM research and development is warranted or prudent. Deliberation and restraint are imperative not simply because of the enormous costs involved, even in the proposed near-term SDI research and technology program, but because the strict limitation of ABM deployments in the Soviet Union and the United States is one of the few points of real agreement reached in the U.S.-Soviet dialogue about nuclear war and arms control. It has practical consequences of great importance for the effectiveness of our deterrent, for the very fragile strategic stability that currently exists, for the coherence of the Alliance, and for hopes of negotiating reductions of the offensive forces and of avoiding nuclear war.

We do not now know - even conceptually - how to build a strategic defense of our society that can render nuclear weapons impotent and obsolete as called for by the President. Nor can one foresee the ability to achieve the President's goal against an unconstrained, responsive threat. Even if all of the technological problems were solved - and enormous advances are required beyond today's technology in order to achieve an ABM defense - there remain severe and unavoidable operational problems. The technical and operational considerations relevant here also raise doubts that a partially effective nationwide ABM defense will be to our net advantage any more in the future than when the question was examined critically fifteen years ago.

Intensified national programs by either the U.S. or the Soviet Union in pursuit of ABM defenses can, and are likely to, prove destabilizing for the strategic balance. Each nation will fear the purpose as well as the capability of its opponent's defenses, with the likely result that both sides will build up their offensive forces to preserve their deterrent capabilities and simultaneously will strive to match each other's anticipated ABM capability. Such an acceleration of the arms competition will not provide security or reassurance to the United States or among our allies, most of whom have shown skepticism about renewed U.S. interest in ABM.

I agree with Ambassador Paul Nitze's statement to the Philadelphia World Affairs Council on February 20, 1985, that for the near-term we should pursue research on strategic defense "*in full compliance with the ABM Treaty.*" Before even considering moving ahead toward deployment of ABMs we must make certain that the new technologies meet two demanding criteria for effective defenses that Nitze stated in this address: The technologies must produce defensive systems that are survivable and that are cost effective at the margin. Otherwise, they will decrease stability by providing tempting targets for a first strike and will provide incentive for the other side to add additional offensive capabilities at lower cost to overcome the defense. No ABM system concept in the past came close to meeting these two critical criteria, and I know of no analysis supporting claims that a future one will fare better. As Mr. Nitze also emphasized, a transition period in which both offensive and defensive weapons were deployed would be tricky and would require Soviet cooperation, with arms control playing a critical role.

I recommend the following six actions in support of our national security needs:

1. Reaffirm our commitment to the ABM Treaty of 1972. It defines the common premises of the U.S.-Soviet effort to avoid nuclear war and to achieve arms reductions, and thus serves our national security goals.
2. Organize and support a prudent, deliberate and high-quality research program on defensive technology within ABM Treaty limits as outlined in the workshop report.
3. Recognize that, at the present primitive state of many of the new technologies it is far too early for us to undertake large technology demonstrations which would be politically mischievous with regard to ABM Treaty compliance, as well as technologically unwarranted.
4. Form a strong Red Team - that is, a team of devil's advocates - to challenge the defense program concepts against potential Soviet countermeasures. Any deployed defensive system will have to be effective against a determined opponent who can resort to a wide variety of countermeasures in order to defeat, deny, evade, destroy, or otherwise overpower the system.
5. Form a senior-level independent oversight panel as recommended in the workshop report. This panel would ensure that the work remains in close harmony with our overall strategic (both military and arms control) goals and policies.
6. Enact legislation in Congress with the explicit provision that the research and technology program must proceed by means that are fully consistent with the ABM Treaty. The legislative record must make clear that this program in no way indicates a change in U.S. strategic policy. An appro-

priation of roughly $2 billion per year is adequate for a strong research program that makes appropriate priority choices in developing new technologies.

Finally, it is important for us all to recognize that the path to a safer world cannot be paved by technology alone. This path will have to be paved initially and for a large part of the way by progress in diplomacy and arms control. Strategic defenses can aid our quest for a safer world only if they are pursued within an arms-control framework that limits further weapons buildups and countermeasures.

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Present Position

- Professor, Deputy Director, and Executive Head of Theoretical Physics, Stanford Linear Accelerator Center, Stanford University, and Co-Director, Stanford Center for International Security and Arms Control

Present Activities

- President-Elect, American Physical Society
- Consultant, Office of Technology Assessment, U. S. Congress
- Consultant, Los Alamos Scientific Laboratory
- Member, Board of Directors, The Arms Control Association, Washington, D. C.
- Member, High Energy Physics Advisory Panel, U. S. Department of Energy (formerly AEC and ERDA), Chairman 1974-82
- Member, JASON Division, The MITRE Corporation (former member of JASON Steering Committee)
- Member, Board of Governors, Weizmann Institute of Science, Rehovot, Israel
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- Member, Council on Foreign Relations, New York
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- Member, Advisory Committee, Harvard University Center for Science and International Affairs
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- American Physical Society (Fellow)
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Awards and Honors

- Fellow of the John D. and Catherine T. MacArthur Foundation, November 1984-
- Ernest Orlando Lawrence Memorial Award - 1972 - for research in Theoretical Physics (Atomic Energy Commission)
- University of Illinois Alumni Award for Distinguished Service in Engineering - 1973
- Guggenheim Fellowship - 1961-62 and 1971-72
- Richtmyer Memorial Lecturer to the American Association of Physics Teachers, San Francisco, California - 1978

- Leo Szilard Award for Physics in the Public Interest - 1980 - presented by the Forum on Physics and Science of the American Physical Society
- D.Sc. (Honorary), University of Illinois, Chicago Circle - 1981
- 1983 Honoree of the Natural Resources Defense Council for work in arms control
- Lewis M. Terman Professor and Fellow, Stanford University - 1979-84

Recent Positions and Activities - GOVERNMENT

1978-82 - Consultant, Senate Select Committee on Intelligence
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1973-81 - Consultant, National Security Council
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1978-80 - Member, Energy Research Advisory Board, U. S. Dept. of Energy
1974-76 - Member, U. S. Defense Science Board Task Force
1960-73 - Office of Science and Technology, Executive Office of the President, Member (or Chairman) of PSAC Panels on national security problems
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Spring 1984 - I. I. Rabi Visiting Professor, Columbia Univ., and Visiting Professor, Rockefeller Univ.
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Spring 1979 - Visiting Fellow, All Souls College, Oxford Univ.
1969-76 - Member, Editorial Council, "Annals of Physics"
Spring 1975 - Schrodinger Visiting Professor, Univ. of Vienna, Austria
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1966-69 - Member, Advisory Council, Physics Dept., Princeton Univ. (Chairman 1967-69)
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Three books and numerous papers in theoretical physics
Facing the Threat of Nuclear Weapons (University of Washington Press, 1983)

Strategic Missile Defense: Necessities, Prospects, and Dangers in the Near Term

A Special Report of the
Center for International Security
and Arms Control

Stanford University

April 1985

Report of a workshop held on October 30, 1984, at the Center for International Security and Arms Control, Stanford University

Co-Chairmen

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Acknowledgments

This report was produced as a project of the Center for International Security and Arms Control at Stanford University, an interdisciplinary program devoted to promoting effective and innovative teaching, training, research, and public outreach in the fields of arms control, disarmament, and international security. The Center, which brings together over fifty arms control scholars and practitioners, emphasizes collaboration among specialists with broadly diverse expertise—academic, technical, and negotiating—in its research. Center research and publications are made possible by private gifts and by grants from the Ford Foundation, the Columbia Foundation, the William and Flora Hewlett Foundation, the Weingart Foundation, the Carnegie Corporation of New York, and the MacArthur Foundation.

The Center acknowledges with appreciation the support for this study provided by the Carnegie Corporation, the William and Flora Hewlett Foundation, and the MacArthur Foundation. The opinions expressed in the report are those of the signatories and do not represent a position of the Center, its supporters, or Stanford University.

Strategic Missile Defense

I. Introduction

On October 30, 1984, a workshop met at the Stanford Center for International Security and Arms Control to examine near-term prospects for and alternative approaches to strategic defense. This report provides the results of that examination and thus represents the consensus of the signatories on a limited set of high-priority objectives and activities in strategic defense.

An earlier study by the Center gave a critical assessment of the President's Strategic Defense Initiative (SDI). One of its recommendations was an unspecified, treaty-consistent research and development (R&D) program in antiballistic missile (ABM) defense at "a level not very different from recent amounts."[1] Because such an effort is also proposed herein, the present report may in that one sense be seen as a logical complement to the earlier study. However, not all of the members of this workshop endorse all of the conclusions of that study. Also, the present report is limited to the ABM research and development the United States should be pursuing in the near term (5–10 years).

A more comprehensive view of the workshop's examination and the findings it has produced is gained by considering the activity of the workshop in the broad context of current issues in strategic defense. That context comprises a great diversity of views and activities. The Department of Defense is formulating programs to expand defensive weapons R&D in response to a charge from the President. There have been extensive criticisms of the emerging Strategic Defense Initiative, on the one hand from those who would accelerate it toward early deployment and on the other hand from those who would reduce it even below the 1984 levels of expenditure on relevant technologies. At the same time, the ABM Treaty itself has been threatened by serious claims and counterclaims of violations, and by erosion caused by advancing technology.

In sum, a convolution of disparate forces has brought the United States to the threshold of major changes, both political and technical, in the strategic defense and arms control context that has evolved since the signing of the ABM Treaty in 1972. This circumstance may not call for major changes in U.S. national security policy; but it does suggest that the United States carefully examine what actions it certainly should be taking now and in the near future (5–10 years) to enhance its security and to reinforce stability in the context of current U.S. and Soviet nuclear arsenals and international competition, and their likely trends. These are the actions the workshop considered and this report addresses.

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[1] Sidney D. Drell, Philip J. Farley, and David Holloway, *The Reagan Strategic Defense Initiative: A Technical, Political, and Arms Control Assessment* (Stanford: Center for International Security and Arms Control, 1984), 98.

The workshop explicitly avoided any critique, interpretation, or analysis of the ongoing effort to realize the President's Strategic Defense Initiative.[2] In fact, the membership of the workshop included people holding a wide range of views with regard to the SDI itself, from strong supporters of the emerging program to those who believe the entire concept misconceived.

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[2] Thus, neither similarities nor differences in work discussed here and the SDI should be taken to imply either direct criticism or endorsement of SDI projects.

II. General Context

We start by stating four major assumptions about the political and military situation of the next ten to twenty years. These assumptions will establish the context for defining necessary work in strategic defense during the next decade.

1. There will be no fundamental or drastic change in the relationship between the United States and the Soviet Union.
2. The strategic military balance will continue to be predicated on nuclear deterrence, which in turn is predicated on the dominance of offensive nuclear weapons. In consequence, entire societies will continue to be vulnerable.
3. The SALT I ABM Treaty will continue to prove valuable for structuring U.S. and Soviet forces on a stable deterrent basis.
4. The current state of development of strategic defense weapons systems, and of many of the technologies necessary to the operation of any particular system design, is inadequate to the task of defending the entire United States against attack by strategic nuclear weapons. Large-scale R&D projects might bring some individual systems or key components to the requisite performance capabilities by the turn of the century or later. The prospects of achieving a fully effective, operating, nationwide ballistic missile defense are highly conjectural.

In section III, we propose a specific set of R&D objectives in strategic defense and closely related technologies. We proceed in section IV to describe the elements of a program to meet those objectives and satisfy them at reasonable cost; section IV also contains brief discussions of the issues of systems and military effectiveness, and of the ability of offensive forces to respond effectively to deployments of defenses. In section V, we discuss briefly the broader security implications of the recommendations made in section IV.

III. Mission

We now assert five objectives for near-term defensive weapons R&D. None of them require deployment of defensive weaponry, although one of these objectives, it will be seen, does imply some possible changes in deployment of offensive forces.

The objectives are to:

1. **Discourage the Soviet Union from a breakout in defensive weapons.** ***Breakout*** means, in the customary lexicon, rapid deployment of large numbers of defenses which, either by their technical characteristics or their numbers, violate the current terms of the ABM Treaty. A breakout would be undertaken with the intent of providing vastly more effective defenses either for national command and military targets or for both military and urban/industrial targets. It is largely immaterial whether the breakout is initiated without advance warning, and so violates the ABM Treaty, or is initiated after a six-month warning of withdrawal, thus not formally violating the terms of the treaty. A Soviet breakout with very large numbers of interceptors and radars might raise doubts about the overall effectiveness of U.S. strategic offensive weapons. This circumstance could undermine the strategic balance. Advanced U.S. technology and the real possibility of U.S. countermeasures, possibly including a defensive deployment in response, could contribute to deterring the Soviet Union from ABM Treaty withdrawal or rapid breakout.
2. **Minimize the adverse effects of a Soviet ABM breakout.** The United States can rapidly adopt responsive measures if it identifies and prepares now, to the extent warranted by the military effectiveness of various possible Soviet breakouts, the most cost-effective means of dealing with a breakout. The means might or might not include a U.S. deployment of extensive defensive weaponry; they would certainly include countermeasures by U.S. offensive forces to maintain their deterrent effectiveness and to defeat the Soviet defenses.
3. **Protect against military or technological surprises harmful to U.S. security.** It is of great importance to its security for the United States to protect itself against technological surprises resulting from major advances in the technologies of either offensive or defensive weapons, or of both. The United States can only accomplish this protection by maintaining its own healthy R&D enterprise in the relevant areas.

   Experience has shown that intelligence assessments of an adversary's technological capabilities can lead to highly misleading conclusions if the assessments are based exclusively on information gathering and inference. A strong R&D enterprise in defense technology, which can supplement such intelligence efforts, would provide a solid base for evaluating intelligence information and would greatly reduce the likelihood of a potentially very costly technological surprise. Such an effort would be generally inexpensive compared to weapons acquisitions. Since the state of technology applied to strategic defense and its counters seems to be changing rather more rapidly now than at any time since World War II, it is imperative that the United States understand and have the ability to foresee those changes at least as well as the Soviet Union and to integrate them into its military and diplomatic planning and into its arms control policy and goals.

   It is vital for the United States to maintain a high capability to identify and evaluate Soviet ballistic missile defense (BMD) activities and technological improvements in particular, so as neither to underestimate nor exaggerate Soviet progress in defense technology. A case of immediate significance and expressed public concern is the growing capability of Soviet air defenses and antitactical ballistic missile (ATBM) defenses to provide terminal defense against strategic missiles, particularly those of shorter ranges.

4. Identify areas of technology or development which should be deemphasized or terminated. The United States will certainly find in the course of research and development that certain systems concepts, or the entire technological approach on which they are based, have little eventual utility either because they turn out not to be feasible at requisite scale, because they cannot achieve systems effectiveness or cost effectiveness criteria, because they are too vulnerable or otherwise too easily susceptible to countermeasures, because they have adverse ramifications (for example, they are politically or militarily destabilizing), or because there are better alternative security approaches. A number of technological approaches have already been found wanting in utility; yet development on some of them proceeds.

   The United States may also wish to cancel or at least defer programs in certain areas because of the mischief those programs work with prospects for achieving essential goals in arms control. An immediate area of concern in this category would be demonstrations of technologies that violate the ABM Treaty or that rely upon and hence pejoratively stress ambiguities in compliance with treaty provisions. A case for going ahead with any such demonstrations could only be made by establishing that their benefits would clearly exceed the potential damage to U.S. national security if the ABM Treaty were terminated.
5. Provide options for limited stabilizing defenses. It remains possible that the United States may wish to deploy limited strategic defenses for specific purposes in the future, either within the limitations of the existing ABM Treaty or by attempting to renegotiate with the Soviet Union some few modifications of the specific limitations. The most obvious possibility in this category is terminal defense of hardened intercontinental ballistic missile (ICBM) silos and launch control facilities against ballistic missile reentry vehicles. Other possibilities, which currently look less likely because of their limited utility, great sensitivity to countermeasures, or potentially high cost, include ballistic missile defense of other military targets, nationwide defense against an accidental launch of one or of a very small number of warheads, and defense against cruise missiles and aircraft. Research will enable the United States to assess the potential value of such deployments, and development of functional prototypes will enable the United States to move ahead expeditiously if cost-effective options have been found and if national needs have been established.

One further purpose that requires vigorous R&D efforts in the strategic defense field is, of course, to help answer the President's request for us to determine if it is possible to render nuclear weapons "impotent and obsolete." No one knows how to do this now, nor how to maintain strategic stability en route to such an admirable goal, but the possibilities should continue to be explored.

The R&D effort in strategic defense cannot be considered in isolation from other U.S. military programs. The direct linkage to offensive force effectiveness is implied in the second of the preceding objectives. It is very difficult for the United States to maintain confidence in its ability to penetrate any proliferated Soviet BMD system (especially one employing better technology than the current Moscow defense) unless it maintains a BMD test facility with evolving state-of-art technology against which to test its reentry vehicles and their penetration aids (pen-aids). Furthermore, would be inconsistent not to reexamine as well the possibilities for defense against air-breathing delivery systems at the same time R&D proceeds on defense against ballistic missiles.

We emphasize the importance of designing and executing the defensive weapons R&D program in ways (within the ABM Treaty) that maintain the range of technological options without, directly or de facto, committing the United States to developing or deploying systems that could be destabilizing and hence harmful to its national security. Neither must the program give rise to the logical presumption that the United States is committing itself to a defensive weapons breakout.

IV. Means

In this section, we discuss strategic defense activities that would develop, in a manner consistent with the national objectives elucidated in the preceding section, the means to achieve effective defense options and countermeasures in the near term.

The requirements for an effective military system obviously go far beyond demonstrations of the technical feasibility of its components. Such a system would face major challenges of integration and reliability, to say nothing of coping with countermeasures, even primitive countermeasures (that is, those which the adversary can employ with little lead time and with no major changes in its own arsenal, simply by changing its tactics). With strategic defense weapons systems, integration and reliability are particularly pressing concerns because the systems tend to be highly complex, the data-handling requirements enormous, the engineering tolerances very small, the time intervals extremely short, and the reliability required remarkably high.

The first task in determining the means to accomplish the strategic missile defense mission is to identify the critical technologies that would be required to implement various candidate systems concepts, and to determine what levels of performance would be required in each application. The workshop concluded that it is now far too early for any program in strategic defense to consider technology demonstrations of types that could raise serious issues of compliance with the ABM Treaty. Almost all of those few technologies that do appear to be ready for such demonstrations are not forbidden by the ABM Treaty.[1] Field testing of some more difficult technologies, such as directed-energy weapons systems, upon which various proposed defenses (especially boost-phase defenses) would rely, would clearly be forbidden. Since these technologies still require many orders of magnitude of development before they can meet minimum systems criteria, it would be foolish to plan field demonstrations of them in the near future.

In addition to the political costs of such early demonstrations (whether or not they violate the ABM Treaty), premature promotion to the demonstration-and-test phase can be very harmful to attainment of any particular goal in strategic defense. A considerable body of evidence has shown that early demonstrations of new technologies have two deleterious effects. First, they tend to freeze the technology being demonstrated before it is fully mature, thus guaranteeing less than full capability. Second, they tend to absorb money from the associated R&D program (because of cost overruns), thus eliminating the possibility of better solutions. In a problem such as boost-phase defense, in which the most promising technologies have the farthest to go, early demonstrations thus may effectively eliminate any chance of success. Therefore, at this time, sensible R&D should proceed; but demonstrations (in space or against targets) of types that could justify charges of ABM Treaty violation should not even be considered before the new technologies reach sufficiently advanced performance goals to merit tests of their ability to meet systems criteria.

In response to the objectives stated above, we have considered work in three categories: (1) so-called traditional or conventional BMD, which we take to mean the nuclear-armed interceptor rockets and radars originally envisioned and considered explicitly by the ABM Treaty, (2) directed energy, that is, laser and particle beam weapons, and (3) supporting technologies, those which are necessary for advanced systems integration and for support of missions closely related to BMD.

Here is a description of the work we recommend in each of these three categories:

1. Conventional Ballistic Missile Defense

Conventional BMD is currently the only candidate system of strategic defense that is based upon tested integration of proven system components. Thus, the threat of a U.S. deployment of conventional BMD is credible and could be instrumental in deterring a Soviet breakout. Similarly, the existence of tested military capability makes conventional BMD instrumental in minimizing the adverse effects of a Soviet breakout on the strategic balance. Thus, an option to deploy or to threaten deployment of such a system must occupy a central role in any strategic defense planning.

The principal goals of work in this category are (a) to develop and maintain on an R&D basis an evolving, state-of-art conventional system and (b) to develop and test pen-aids against that system to maintain the effectiveness of the U.S. offensive deterrent. These two goals must be addressed as a joint effort. Together they represent one of our major recommendations: development and operation at Kwajalein Island of a test facility incorporating a single, integrated, but evolving conventional terminal defense system (a functional prototype) and advanced offensive pen-aids. Within certain broad limits, the provisions of the ABM Treaty permit development and testing of fixed, land-based systems components relevant to these goals. There are four separate tasks to meet the goals:

1. Prototype terminal defense system. The Unites States currently has no bench-marked terminal defense system; the Soviet Union has deployed a BMD system around Moscow and upgraded it (within

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[3] Examples are sensor acquisition studies, low-power pointing and tracking experiments, large-scale integration of small mirror elements, and atmospheric compensation experiments.

treaty limits) twice since the signing of the ABM Treaty. Thus, the Soviet system not only is fully bench-marked but also implies the existence of production lines. Even if U.S. technology is superior in the critical areas (missile, radar, and computer performance and cost) of conventional BMD, the asymmetry in this state of affairs undermines U.S. efforts to strengthen ABM Treaty compliance. The Soviet Union may at some time perceive, correctly or incorrectly, an important military advantage to a breakout in which it can have sole possession of a proliferated defense for a period of years. This consideration becomes more serious as technology improves and makes the defenses more effective. It would become particularly serious if future arms control successes were to result in major reductions in offensive strategic arms and thereby greatly increase the leverage of defense. Therefore, to meet our first objective—maintenance of a strong incentive to ABM Treaty compliance—it is important to develop a functionally prototyped system of interceptors, radars, computers, and communications.

The dominant reason, however, for constructing and operating a functional prototype defense arises from the second objective—minimizing the adverse effects of a Soviet breakout. There are two components to meeting this objective. First, the critical element of a U.S. response to a Soviet breakout is deployment of pen-aids on U.S. ballistic missiles. However, a program to develop and modernize pen-aids cannot succeed and provide confidence without a working and modernized BMD test facility against which to test them. Second, if the Soviet Union does elect to break out and proliferate defenses, it is not clear to what extent the United States would wish to respond by deploying and proliferating its own BMD. It is doubtful, however, that the U.S. response would be completely limited to the enhancement of offensive systems, even if the United States were confident in the ability of its forces to negate Soviet defenses with pen-aids. Thus, in order to have the option of defense deployment available (at whatever scale), the United States should develop a state-of-art functional prototype, which would allow an expeditious counterdeployment in the event of a Soviet breakout.

Finally, the availability of a capability for terminal defense meets the fifth objective—to provide options for limited, stabilizing defense. One particular possibility in this category might arise if in the future the United States and the Soviet Union were to decide jointly to permit expanded hard-site defense to address the problem of ICBM vulnerability. In such a case, the only way, based upon what we are now capable of both technologically and militarily, that such an option would be available to the United States would be through a conventional BMD system.

Of course, such a deployment, if it were concluded to be strategically advantageous, would require renegotiating some terms of the ABM Treaty—at least the provisions governing numbers of interceptors and radars, and probably mobility and deception as well. Members of the workshop differ on the relative weight of risks in reopening negotiations on the ABM Treaty and potential benefits of reducing

ICBM vulnerability; consequently, it is not a recommendation of the members that this course be explicitly considered. If further defensive proliferations could be convincingly prevented, dedicated hard-site ICBM defense could be stabilizing to the nuclear balance. However, two important technical issues would certainly have to be settled before any change to the ABM Treaty could be considered to be an attractive policy option: (a) guaranteeing that hard-site deployments could be unambiguously defined and verified as hard-site and not area defenses and (b) demonstrating that a hard-site defense enjoyed a strong, favorable cost-effectiveness ratio against increases in numbers of Soviet reentry vehicles (RVs) and in their penetration capabilities. Many members believe that explicit prohibitions on increases in offensive weapons would also be necessary.

2. **Penetration aid development program and test program.** Pen-aid development was allowed to wither almost out of existence during the last decade. Because this failure violates both the objectives of deterring breakout and of minimizing its impact, we strongly recommend the vigorous resuscitation of the pen-aid development and test program. The United States must be capable of determining the effectiveness of various signature suppression, simulation, and anti-simulation techniques against a diversity of possible defensive sensors.
3. **Studies and development for advanced systems.** This element actually comprises two tasks in the upgrading of conventional BMD, again to meet the first, second, and fifth objectives. First, a functionally prototyped system should be continually upgraded to keep pace with advances in component technologies. This task should include research on mobile and deceptive components (note that development and testing must be strictly limited under the ABM Treaty); development of more capable interceptors, including faster, more agile ones, and ones with homing capability; sensor improvements to defeat pen-aids; sensor survivability studies and optical technology improvement in general; and development of more capable, more survivable, cheaper radars and computers.

   Second, R&D should continue on defense concepts from the category usually referred to as simple-novel—concepts which generally try to avoid the advanced technology and complex systems requirements of conventional BMD systems. One idea from this category that has particular appeal to many workshop members is the so-called dust defense, in which buried nuclear explosives cast up large quantities of fragmented rock in the paths of incoming RVs. Adding an element of dust defense could, for instance, greatly reduce the vulnerability of a conventional interceptor defense to attacks in which large numbers of attacking RVs arrive practically simultaneously (attacks with high threat rates).

   A future systems concept which has received considerable attention lately is known variously as non-nuclear kill (NNK) or kinetic energy weapons (KEW); generically, both these terms mean projectiles which home on RVs and strike them. This hit-to-kill approach has been proposed for systems in the atmosphere, and has actually begun testing for midcourse intercept in space (the Homing Overlay Experiment). Performance requirements for endoatmospheric NNK are considerably more stressing than those for conventional nuclear systems in the same engagement areas; NNK requires terminal homing and faces the fundamental difficulty of requiring discrimination at higher altitudes. Hence, it does not qualify in the simple-novel category. Consequently, we do not recommend a strong development effort in this area. Some research on this approach should be maintained because of the potential political advantages enjoyed by an NNK system if the greater technical difficulties could be overcome. Exoatmospheric KEW, however, is a different matter. The critical technical limitation on such a system is not in the interceptor but in the area of decoy discrimination; this task is included in the category, *Supporting Technologies*.

4. **ATBM studies.** At the time of the ABM Treaty, the United States successfully argued for exclusion of ATBMs from limitation by the treaty. Part of the U.S. motivation was the intent that the Patriot air defense system (then called SAM-D), then several years in development and presumably not far from deployment, would have a significant ATBM capability; the Soviet Union did not appear to have an equivalently advanced counterpart. Now, twelve years later, Patriot has had difficulties meeting its air defense specifications and is not formally considered an ATBM. Meanwhile, the Soviet Union is on the threshold of deploying a purportedly capable ATBM, the SA-12. The United States should respond with two steps. First, it should review its strategic offensive systems and consider radar cross-section reduction and modest pen-aids for its RVs. Second, the United States should reconsider the question of the direct military value of an ATBM. Several possible courses of action should be examined if an ATBM is found to have significant military value. Among these options are, first, that a separate ATBM system be developed, either from scratch or from adaptation of components taken from existing systems (including Patriot) and, second, that the United States seek an effective arms control ban on ATBMs.

2. Directed Energy

The category of directed energy comprises three tasks, which we call laser technology, X-ray lasers, and exotic systems.

Research on directed-energy killers is essential to protection against technological surprises and can contribute to deterrence of a Soviet breakout, since maintenance by the United States of strong technologies in this area helps fuel uncertainty in the Soviet Union as to the type and effectiveness of a U.S. response to a Soviet breakout. Directed-energy sensors and discrimination techniques may also eventually contribute to minimizing the impact of a Soviet breakout and to provisions of stabilizing defenses. Of course, directed-energy R&D must also meet our fourth objective—identifying technologies with insufficient capabilities.

Directed-energy research has received the gaudiest and most extensive press coverage of all defensive weapons technologies and has inspired a broad range of strong views. However, several members of the workshop have extensive expertise in this field, and they achieved a remarkable consensus on the relative merits of the various technology components almost from the outset. We present that consensus with a minimum amount of explanation of the criteria of choice. The reader who disagrees violently with the inclusion or exclusion of a particular technology should bear in mind that the relative priorities assigned within the directed-energy category are a matter of distinctly secondary importance to the overall schema presented in this report. The primary results of the workshop are the assignment of overall priorities within a reasonable level of effort and the emphasis on near-term, achievable military and arms control goals.

1. **Laser technology.** Perhaps the most controversial of the workshop's choices is to eliminate infrared (IR) lasers from consideration as BMD weapons. Chemical IR lasers have been proposed for predeployment in space to accomplish boost-phase kill of ICBMs. Such deployment would add a number of considerable disadvantages: the need for very costly redundancy in order to maintain laser satellites on station at all times; the high cost of vast energy stores in space; and, above all, the vulnerability to direct attack by a number of means at highly favorable cost-exchange ratios to the offense. We believe that these factors make such laser battle stations in space completely impractical. Hence, for laser weaponry, our recommendation is to concentrate work on increasing the capabilities of ultraviolet (UV)/visible lasers, particularly ground-based ones.

   Other principal elements of laser technology R&D in the BMD context are: adaptive optics for atmospheric compensation of the laser signal; large-diameter, diffraction-limited mirrors; efficient, reliable power supplies and switching; transmission through induced atmospheric disturbances; and acquisition, pointing, tracking, and kill assessment sensors and optics meeting stringent criteria. Low-power lasers may play roles in this last element, and may be based anywhere and employ a variety of wavelengths, including IR.

   Research in these fields could have significant utility in civilian as well as military applications outside BMD, and should proceed vigorously. High-energy ground-based lasers will certainly provide some military capability in antisatellite (ASAT) weaponry. We recommend that the ramifications of this prospect be considered fully (see under *Space Survivability* in the following category, *Supporting Technologies*).

2. **X-ray lasers.** Nuclear-driven x-ray lasers present a defensive weapons technology with some potential for employment in support of offensive operations as well. Currently there is very great uncertainty in performance levels that can be reached or maintained against countermeasures. If the moderately high brightness levels that have been discussed publicly[4] are achieved, X-ray lasers could be used as ASAT weapons; it is possible that they might be integrated into offensive weapons systems for suppression of retaliatory ICBM launches following a first strike. If very high brightness levels are achieved, X-ray lasers could be the basis of a potentially effective defensive layer. Since the Soviet Union is, virtually certainly, also conducting R&D in this area, the United States has a strong incentive to understand what performance levels are actually achievable. Consequently, a robust research program within ABM Treaty limits is recommended here as well.[5]

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[4] Clarence A. Robinson, Jr., "Study Urges Exploiting of Technologies," *Aviation Week and Space Technology* 119, no. 17 (October 24, 1983): 50.

[5] This recommendation is not posed as an argument against future changes in the Threshold Test Ban Treaty.

3. **Exotic systems.** In this category, we place particle-beam weapons of all types and decoy discrimination techniques which employ particle-beam weapons. All of these are well behind lasers in terms of demonstrated performance levels, engineering of components and related systems, and design of a credible military system. We also include in this task free electron lasers, since their demonstrated performance is quite primitive. Our recommendation is that this entire task, as is appropriate to the high-risk component of any research program, be allocated about 5–10 percent of the total funds in the directed-energy category.

Supporting Technologies

This category comprises six tasks with somewhat disparate purposes:

1. Midcourse discrimination technology and nuclear weapons effects research. There are several means, including nuclear weapons in various deployment modes and non-nuclear hit-to-kill projectiles (such as the one tested in the Homing Overlay Experiment), by which the defense might kill RVs in midcourse. Most of these means seem potentially reasonable as components of military systems, provided their targets can be uniquely identified. However, no one has yet solved the original problem which plagued the Nike Zeus project in the late 1950s—how to tell the real RVs from decoys and sensor noise. There are currently numerous suggestions for solving the discrimination problem with both active and passive optics of various descriptions and with more exotic means such as high-energy particle beams and specially designed nuclear weapons.

   If Soviet understanding of the midcourse discrimination problem were to improve and U.S. understanding of this problem did not, potentially dangerous instabilities could occur (for example, if the United States were not prepared to or did not know how to counter future Soviet discrimination techniques). As it stands now, the United States has no well defined and diversified set of programs to increase its understanding in this most important area of uncertainty. The United States should be conducting a broadly based R&D program to evaluate plausible midcourse discrimination techniques. Since actually intercepting and killing the RVs seems credible only if it is possible to deal with countermeasures, it is necessary to investigate all promising schemes for midcourse discrimination against the range of plausible methods of denying the defense observables or discriminants (maskers, jammers, decoys, antisimulation, tactical measures).

   It is also necessary to find a reasonable way to simulate and analyze the effects of an environment containing multiple nuclear weapons detonations. In fact, no one really knows what the physical characteristics of such an environment would be: order-of-magnitude uncertainties abound in critical factors such as electron density and radiation flux density as a function of wavelength. Study of the effects of high-altitude nuclear weapons detonations is another research area that has been poorly supported during the last decade. Our ability to predict the effects of high-altitude nuclear weapons effects is currently insufficient to permit confident assessment of the performance of virtually any BMD system. We strongly recommend that this area of research be resuscitated in support of both discrimination R&D and pen-aid development.[6]

2. Improvements in warning and acquisition sensors. The array of radar and/or optical sensors on which the defense relies for immediate warning of an attack and a quick analysis of the size of the threat (attack assessment) must be accurate and highly reliable. Independent of defensive weapons programs, a constant improvement of sensor quality and survivability is vital and should be a matter of extremely high priority. In addition, the United States should complement existing methods with sensors working on different principles; it should do what it can to protect the satellites from direct attack and to harden them against long-range nuclear weapons effects; and it should proliferate them.

   Beyond warning and threat assessment, however, considerable additional sensor performance is required for any multi-tier BMD system. The sensors must have the sensitivity to acquire individual targets, the precision to track both boosters and RVs, and the ability to judge the success of the defense's attack; and they must be capable of doing so in severe nuclear environments.

   The problem of nuclear environments is perhaps not so severe for satellite-borne as for airplane-borne tracking, but the effectiveness of precursor bursts to confuse or blind even satellite sensors remains beyond present capacity to calculate with confidence, far less test.

   Thus, vigorous programs of sensor R&D and survivability enhancement and of improving the understanding of nuclear environments should proceed regardless of BMD research and development.

3. Space survivability. A broad research effort should be undertaken to examine the survivability of all space-based assets to a full range of credible threats. An understanding of space survivability issues will, of course, be critical to understanding the feasibility of many advanced defensive weapons systems and to understanding possible threats to intelligence, warning, and communications systems. Two specific possibilities must be addressed within the framework of such an effort: space mines and ASAT systems.

   Space mines—long-lived satellites, containing either conventional or nuclear explosives, that can maneuver within range of other satellites to kill them—provide a simple, inexpensive response to hostile deployment of space-based weaponry. As in other cases, conventional explosives have the virtues of greater political acceptability and adherence to the Outer Space Treaty, while nuclear explosives have the virtue of considerably easing performance requirements, in this case requirements on tracking the target satellite and maneuvering close to it. Some members of the workshop express concern at the full development of even conventionally armed space mines, especially until firm national and arms control policies concerning all ASATs are developed. All agree, however, that space mines should be studied carefully, particularly as responses to space-based BMD, with any technical and systems issues being clearly defined and bounded and with the ramifications of deployment in various arms control scenarios well delineated.

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[6] This recommendation does not suggest a resumption of atmospheric nuclear testing.

With regard to the relationship between ASAT and BMD, there are two cases, the converse of one another: the effect of ASAT R&D upon BMD technology evolution, and the effect of BMD R&D upon ASAT technology evolution. In the latter case, we are agreed: any comprehensive program of R&D for area defenses will also be addressing most of the critical issues in ASAT development. In simple terms, an exoatmospheric BMD capability implies an ASAT capability; since BMD is a much more difficult task, partially effective missile defenses may prove to be very effective low-altitude ASATs. As to the former case, however, we have not arrived at a consensus.

The extent to which ASAT weapons R&D and deployments are actually coupled with BMD must be examined further and clarified. Because of the linkage between ASAT and BMD, the interactions between arms control efforts and weapons development contain many areas still open to conjecture, particularly those relating to verification. The question, then, must be asked both ways: how do ASAT development and deployment and potential deployments affect U.S. national goals with respect to BMD? and, how do BMD development and potential deployments affect U.S. national goals with respect to ASAT?

4. **Fast-burn boosters.** Should the product of Soviet space-defense research become capable of engaging U.S. ICBMs in boost-phase or midcourse, the United States should be prepared to respond with appropriate and timely countermeasures. A potentially straightforward countermeasure to a great variety of boost-phase attacks could be the employment of fast-burn boosters. Because their fuel burns out so rapidly and at altitudes which are quite low relative to today's boosters, such boosters could become very difficult to engage during their boost phases. Additional denial of engagement capability might also be achieved by more rapid deployment of RVs and decoys from a missile immediately following the boost phase. Consequently, we recommend a modest development program to evaluate fast-burn boosters and rapid RV deployments. This work would also allow evaluation of the effectiveness of such Soviet programs to counter boost-phase defenses. We do not recommend full-scale development and testing, but we do recommend establishing an R&D base to provide that capability; in the lexicon of the Department of Defense, we are proposing a continuing program of 6.2 and 6.3a development.
5. Battle management. Any large and complex defense system will need to be able to acquire and handle enormous amounts of data from sensors, to analyze the data rapidly, and to commit the appropriate systems components to the engagement. This demanding set of data-handling and logic tasks is referred to as battle management. A multi-tiered nationwide defense will require improvements in technologies needed for battle management so great as to be appropriately characterized as revolutionary. A moderate-size program to define requirements and to develop both hardware and software for this challenging control problem is clearly required. Eventually it should be possible to establish firm, objective criteria for systems complexity, which in turn would permit proposed schemes to be judged against one another, and perhaps some minimum standards to be set.

6. **Aircraft and cruise missile defense. The United States should expand studies into the feasibility and desirability of installing defenses against air-breathing weapons because the technological prospects have been changing rapidly. This work is needed as a matter of balance. Otherwise, if the United States were actually to succeed in providing nationwide ICBM defense, it would be in the embarrassing position of having a defense against the currently most numerous and threatening carriers of nuclear weapons but no defense at all against the others.**

Further Studies

In addition to the tasks just described, there are several policy aspects of strategic defense that require further intensive study. Four important issues to address are:

1. Transition to defense dominance. If, in fact, a strategic defense system effective enough to establish defense dominance is developed, is there a stable strategy for deploying it—one which does not lead to a high risk of inciting a nuclear strike during the transition period?
2. First-strike adjunct. Does an effective or partially effective area defense inevitably create a potential first-strike capability through ability to suppress retaliation? How does this implicit risk scale with the effectiveness of the defense, and does it lead inevitably to instability? What is the role of air-breathing forces?
3. Automation. How high a degree of automation will be required of the prospective strategic defense? What precisely are the acceptable limits of automation? This issue is particularly pressing for boost-phase defenses.
4. **Allied deterrents. U.S. allies have expressed fears that U.S. and Soviet nationwide defenses would undermine the effectiveness of their own deterrents and the validity of NATO strategy, perhaps leading to a decoupling of Europe as a conflict zone. To what extent are these fears justified? Can any such effects be mitigated?**

Vitality and Responsiveness

A program proceeding from research to development can and will remain vital and responsive to its objectives only if it is continually challenged to do so. Too often in such programs the necessity of demonstrating favorable cost-exchange ratios against opponents is forgotten or conveniently kept well in the future.

To prevent this, we suggest the establishment of two critical advisory bodies. The first would be a "Red Team" to provide analysis of the offense and of countermeasures and to evaluate the offense's cost effectiveness in defeating the defense. This Red Team should have a charter independent of the management of defensive weapons R&D. A close connection should be established between the Red Team and the intelligence agencies, for their mutual benefit. The Red Team would thus receive more realistic and detailed accounts of Soviet capabilities; the intelligence community would be assisted in focusing its efforts on U.S. needs for intelligence on what the Soviet Union is doing both in defensive and offensive countermeasures.

The second critical advisory body would be a senior-level, independent

oversight panel that would examine work on defensive R&D and report at a very high level in the Administration. The panel should comprise both experts in the various technological and military specialties and former public officials in defense and arms control matters. This panel should maintain knowledge of the technical and programmatic status of work on defensive weapons that is sufficiently detailed for the panel to advise the government on the setting of priorities. The panel should also conduct periodic reviews of the R&D to ensure that the work remains in close harmony with U.S. overall strategic goals and policies (both military and arms control).

V. Ramifications

The R&D activities we have recommended would directly enhance national security through accomplishment of the first three objectives discussed in section III: deterrence of Soviet ABM breakout, minimizing the effects of such a breakout, and protection against technological surprises. That is, such R&D would give the Soviet Union a solid incentive for observing the ABM Treaty and provide the option of a comparable capability if it breaks out of the treaty, either using currently available technology or something new.

The opportunity cost of this work would be quite low, since its total cost is not likely to be very different from the sum of amounts which were spent on its various components in the recent past. Those programs were able to compete successfully for funds with other military development programs then, even though they did not possess particularly high priorities, either in the armed services or in the Department of Defense. Thus, they did not represent a high opportunity cost to other kinds of pressing endeavors.

The R&D proposed here is specified to be fully consistent with the provisions of the ABM Treaty, and so poses no threat to the Soviet deterrent forces or to the fundamental basis of the U.S.-Soviet strategic relationship. The Soviet Union is already carrying out similar, broad, advanced, defensive R&D and in contrast with the United States is actually engaged in prototyping and deploying conventional terminal BMD defenses. A deliberately paced U.S. research effort on strategic defense, organized and prosecuted with clearly stated goals and means and abiding by the ABM Treaty, should serve our security well at reasonable cost and should give the Soviet Union no reason to feel the need for additional offensive or defensive forces. Apart from real incentives, it is necessary to deal with incentives that arise entirely from fears and perceptions. A U.S. effort with proper planning, explanation, and diplomacy should not create a problem of Soviet perceptions vis-à-vis strategic or arms control stability.

The impact of such clearly defined and constrained activities on the ABM Treaty should be nil in the near- and mid-terms. Success in persuasively creating a new approach to effective national defense would indeed present a challenge to the ABM Treaty. If this should occur, it would do so well into the future, and regardless of which side would succeed. In such an eventuality, the United States would have to resolve and negotiate a new arms control policy, one that would successfully integrate offensive and defensive forces.

An important function of the high-level oversight panel that we advocated in section IV would be to assure that priority attention will be given on a continuing basis to the broad effects of the R&D program on U.S. national security and arms control objectives.

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M. Elisabeth Paté-Cornell, Assistant Professor, Industrial Engineering and Engineering Management
William Perry, Executive Vice President and Managing Director of Technology, Hambrecht and Quist
Theodore J. Ralston, Representative, International Liaison Office, Microelectronics and Computer Technology Corporation
Condoleezza Rice, Assistant Professor, Political Science; Assistant Director, Center
Kiichi Saeki, Senior Advisor, Nomura Research Institute, Tokyo
James J. Sheehan, Chairman, History
Motoo Shiina, Member of the House of Representatives, National Diet, Japan
Lawrence Smith, Director of Studies, National Security Programs, John F. Kennedy School of Government, Harvard University
Robin Staffin, Staff Member, Lawrence Livermore National Laboratory
Strobe Talbott, Head, Washington Bureau, *Time*
Robert E. Ward, Professor, Political Science; Director, Center for Research in International Studies
Edward L. Warner III, Senior Research Staff Member, Rand Corporation
J. Fred Weintz, Jr., Partner, Goldman, Sachs and Co.
Albert D. Wheelon, Vice President, Space and Communications Division, Hughes Aircraft Corporation
John A. Wilson, Senior Partner, Wilson, Sonsini, Goodrich and Rosati

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ANSWERS TO QUESTIONS OF THE COMMITTEE ON APPROPRIATIONS

UNITED STATES SENATE

Pursuant to Testimony Given by

SIDNEY D. DRELL

April 22, 1985

QUESTION 1 - "RAMP UP" OF EXPENDITURES:

Other R&D programs, such as the Apollo program and the Space Shuttle have had steep R&D "ramp ups", and U.S. industry was able to respond to those challenges.

What makes you think that there will be a problem in getting industry to support SDI at the levels proposed by the President?

ANSWER 1:

I do not see problems in getting industry to support SDI with increasing expenditures as proposed by the President. One of the difficulties in accommodating to a steep "ramp up" of R&D is spending the money efficiently. In particular, there is a body of evidence that premature promotion to the more expensive demonstration and test phase of new technologies can lead to inefficiency and less than optimal solutions. In contrast to the Apollo program and the Space Shuttle which were major technical undertakings to achieve specific and fixed goals - and which were both successful - the SDI is a research program designed to meet an operational goal - i.e., to develop viable options for a defense against the ballistic missile threat of an adversary who can choose a variety of countermeasures to destroy, defeat, or evade the defense. As such, it involves developing a large variety of approaches concurrently. SDI is not as yet ready to eliminate various candidates as unpromising; therefore, most of the contending programs will be "ramped-up" in parallel - a highly inefficient and wasteful process.

QUESTION 2 - SPENDING:

General Abrahamson has told us that 40 percent of all FY85 SDI appropriations were obligated by the first quarter of FY85; he expects over 95 percent to be obligated by the end of the year - remember that R&D money is available over two years, not just one year.

Aren't these encouraging signs as to our being able to execute and manage the SDI program?

ANSWER 2:

The largest fraction of programs under the SDI Office are "inherited" ones; these had continuing funding expectations, with or without a new overall mission. The ability to spend more money in continuing programs is not a good measure of executive or management capability.

QUESTION 3 - COMPETITION:

As a rule, how can we best foster competition in the SDI program? To what extent is maintenance of competition dependent upon a healthy level of funding for the program?

ANSWER 3:

Competition must be between offensive and defensive teams, with similar imaginative levels of effort. Strategic offense has had no such challenge since the signing of the ABM Treaty in 1972. One will get an unrealistically optimistic estimate of defensive expectations unless offensive planners are given equally strong commitment and support for the mission to penetrate proposed defenses. This calls for the creation of a red team with a charter independent of the management of the SDI team as advocated in the Stanford workshop report and in my testimony. Studies of this sort require much less funding than the construction and test of devices. The recommended level of funding (roughly $2 billion) is entirely adequate for such competition between offense and defense.

QUESTIONS SUBMITTED BY SENATOR BYRD

QUESTION 4 - BMD R AND D:

You argue that even if an SDI type system were never deployed, there would be increased instability as each side struggled to keep up with the other in preserving deterrence. Does this mean that you do not support even an R&D program for Ballistic Missile Defense? If you do support R&D, at what funding level?

ANSWER 4:

I definitely do support a prudent and high quality R&D program on ballistic missile defense within the provisions of the ABM Treaty as advocated by Ambassador Paul Nitze in his speech to the World Affairs Council of Philadelphia on February 20, 1985. As stated in my testimony and as developed in the report of the Stanford workshop from which I quote:

"The R&D proposed here is specified to be fully consistent with the provisions of the ABM Treaty, and so poses no threat to the Soviet deterrent forces or to the fundamental basis of the U.S.-Soviet strategic relationship. The Soviet Union is already carrying out similar, broad, advanced, defensive R&D and in contrast with the United States is actually engaged in prototyping and deploying conventional terminal BMD defenses. A deliberately paced U.S. research effort on strategic defense, organized and prosecuted with clearly stated goals and means and abiding by the ABM Treaty, should serve our security well at reasonable cost and should give the Soviet Union no reason to feel the need for additional offensive or defensive forces. Apart from real incentives, it is necessary to deal with incentives that arise entirely from fears and perceptions. A U.S. effort with proper planning, explanation, and diplomacy should not create a problem of Soviet perceptions vis-a-vis strategic or arms control stability."

I believe such a carefully constructed national effort should not increase instability by threatening deterrence.

QUESTION 5 - MUTUAL ASSURED DESTRUCTION:

You seem to be arguing in favor of retaining the policy of mutual assured destruction, which is a very unattractive prospect. Do you truly believe that we will NEVER be able to build an effective defense?

ANSWER 5:

I recognize mutual assured destruction - based on the mutual vulnerability of U.S. and Soviet societies to near-total devastation - to be an unavoidable condition in today's world heavily armed with some 50,000 nuclear weapons. The President's goal of building totally effective defense to render these terrible weapons "*impotent and obsolete*" is indeed very attractive but, I believe, unattainable.

If defensive systems are to contribute to a safer and more stable strategic relationship between the United States and the Soviet Union, they will have to be embedded in a strict arms control regime that limits offensive systems. Technology alone will not solve the political problem of managing the strategic relationship with the Soviet Union.

QUESTIONS SUBMITTED BY SENATOR PROXMIRE

QUESTION 6 - COUNTERMEASURES:

I think you would agree that the physics and engineering problems we would face in putting up a Star Wars system would be monumental. But wouldn't the biggest hurdle we would face in deploying a Star Wars system be overcoming Soviet countermeasures, be they Soviet penetration aids or attacks on our defensive system? Isn't that the ultimate hurdle of any Star Wars system - its ability to overcome Soviet attempts to defeat, deny, evade, destroy or otherwise overpower our system? Shouldn't one of the highest priorities in SDI be research into Soviet countermeasures? Is this receiving the priority it should have in the current SDI budget?

ANSWER 6:

Countermeasures research may be determinative in deciding the future potential of SDI and must be aggressively pursued, in any event, to hedge against possible Soviet systems which could reduce the efficiency with which U.S. warheads reach intended targets. This effort must be revitalized and managed outside the SDI effort in order to fully challenge the defense programs. Within the SDI program there should be an expanded countermeasures program - including prototyping a terminal defense within ABM Treaty provisions - both to study Soviet countermeasures and to hedge against Soviet breakout from the ABM Treaty. I do not believe that countermeasures have thus far received sufficient attention, nor do they appear to receive it in the FY86 budget of the SDI program.

QUESTION 7 - BARGAINING CHIP:

We've heard it said that the President's Star Wars program has been a bargaining chip to get the Soviets back to Geneva. Can SDI still be a bargaining chip at a lower funding level? How should we treat this program in terms of it possibly being a bargaining chip?

ANSWER 7:

Whatever role the SDI may have played in the renewal of the Geneva talks, the issue now is how do we want to use its leverage at the bargaining table. A high quality research program can be carried on within the ABM Treaty with the expenditure of roughly $2 billion. As described in the Stanford workshop report, this will explore new technologies and provide for a hedge against breakout. A program that maintains a U.S. space capability at the research frontiers, but at the same time does not portend a breakout by the U.S. to systems deployments threatening to the Soviet deterrent can be used as leverage for negotiating offensive reductions in return for a strengthened ABM Treaty regime. If, as we believe, the Soviets have a genuine interest in preventing further weapons threats in or to space, this can be a most effective approach to the negotiations.

QUESTION 8 - SOVIET BMD:

We have heard a lot about the Soviet ballistic missile defense effort. In fact, the Administration has justified its pursuit of Star Wars because of the Soviet BMD effort. Can you put what the Soviets are doing in ballistic missile defense in perspective for us? How do both countries compare in BMD research and BMD deployments for example?

Is the Star Wars research the Administration has structured and the funding level it has requested the proper response to the Soviets BMD effort? If not, what kind of response should we be making?

ANSWER 8:

The most significant difference between Soviet and U.S. BMD efforts is in the existence and upgrading of the Moscow area defense, as permitted by the SALT I ABM Treaty, which might be able to stop a small attack. The U.S. has no comparable system in being, or prototyped, and, therefore, only limited ability to develop offensive penetration aids to hedge against a widespread proliferation of similar defenses in the U.S.S.R. A similar deficiency exists in the absence of a competitive U.S. program to develop a modification of surface-to-air missiles which might provide some level of theater defense against tactical ballistic missiles (ATBM) comparable to the Soviet SA-12 development.

Both countries have had active directed energy R&D programs for many years, but neither has come anywhere near developing an ABM capability based on them.

The Stanford workshop report and my testimony present the outline of the proper U.S. response within the ABM Treaty.

QUESTION 9 - TECHNOLOGY DEMONSTRATION:

Dr. Drell, in the report from the Stanford Workshop you cite the danger of SDI plunging ahead with technology demonstration. Not only would these technology demonstration projects do mischief to the ABM Treaty, but your workshop also points out that they would do harms to the Star Wars research. Could you explain what we're talking about when we say technology demonstration projects and explain further how they do damage to the Star Wars research at this point? Perhaps, you could use the demonstration project in space-based chemical lasers as an example?

ANSWER 9:

A technology demonstration of a space-based chemical laser, for example, might construct a manned space platform with a high-power infrared laser directed through optics similar to the space telescope (2.4 meters in diameter). Initial tests might be against a nearby instrumented co-orbiting target satellite, followed by one against an ICBM booster launched from Kwajalein. At this time the power levels achieved by such chemical lasers and the limited mirror size lead to beam brightnesses far below what could be considered of interest for a space-basedlaser system for boost phase intercepts. Also, for reasons given the Stanford report and in my testimony, we see no BMD role for such a system. However such a demonstration could well be interpreted as a violation of Article V of the ABM Treaty (no testing or development of a space-based system) and also drain many intellectual and financial resources from several other more interesting and more important approaches. Ground testing of such a laser on the other hand would be much cheaper and would present no treaty complications since it would fall under the category of permitted research in the laboratory. I want to emphasize that demonstrations of the intercept of single cooperative targets can be misleading with respect to real-world systems problems against uncooperative, decoyed targets launched at unanticipated trajectories.

QUESTION 10 - MIDCOURSE DISCRIMINATION:

Let's look at another demonstration project SDI is pursuing vigorously - exo-atmospheric non-nuclear kill vehicles. Last summer we had a demonstration of such kill vehicle's with the Army's homing overlay experiment. HOE, as we all know, was successful. In effect, we demonstrated that a bullet could hit a bullet. But is that the critical hurdle we face in the midcourse defense? Isn't that peanuts compared with the problem of discrimination - separating the decoys from the reentry vehicles? Are we plunging too quickly into demonstration projects for midcourse kill vehicles before we have a clear idea of what idea of what kind of hurdles we have to overcome in surveillance?

ANSWER 10:

Discrimination above the atmosphere is very much more difficult than hitting a bullet with a bullet. In fact, we do not know how to do it against advanced techniques for decoys, simulation, or anti-simulation, as discussed in my testimony. Both the U.S. and U.S.S.R. have tested decoys and location masking devices which would defeat the HOE-type intercept. There is little chance of being able to pay for a one-on-one intercept of each such object.

Exo-atmospheric non-nuclear kill vehicles are also subject to the same kind of end-game distraction used to keep missiles from hitting aircraft. Radar chaff, infrared flares, and electronic countermeasures have a respectable track record. In nuclear war one also has to anticipate the effects of large nuclear explosions within the battle space.

SDI will fail unless the discrimination problem is solved.

QUESTION 11 - CONVENTIONAL BMD:

One of the goals of SDI should be as a hedge if the Soviets did break out of the ABM Treaty and did begin deploying a missile defense system. The terminal defense project under SDI in the Kinetic Energy Weapons Program - which is called HEDI for High Endoatmospheric Defense Interceptor - would likely be our hedge against a Soviet breakout of the ABM Treaty. But that project is researching high-altitude non-nuclear interceptors for the terminal phase. Is this type of research really the best hedge against a Soviet breakout of the ABM Treaty?

ANSWER 11:

The best hedge against a Soviet breakout of the ABM Treaty would be to be prepared to deploy extensively penetration aids on our offensive forces. To develop such pen-aids we should maintain an advanced technology functional prototype at Kwajalein for testing purposes within the provisions of the ABM Treaty. This is a major recommendation of the Stanford workshop. Should the Soviets break out, we may also choose to deploy a defense - but in this case a traditional terminal defense with nuclear warheads is the preferred approach, as presented in my testimony. As recommended there, we should renew support for such work - in contrast to the current SDI program - as well as investigate more advanced concepts.

QUESTION 12 - "HORSE RACE" PROGRAM FUNDING:

The SDI organization has instituted what it calls the "horse race" concept under its Systems Program - under which it has 10 contractors, in effect, racing to draw up plans for how the entire Star Wars systems would look like. Then, supposedly, General Abrahamson and his people would pick the best plan and organize the technology around it. Is this really the best way to go - racing to develop a systems architecture before we have a clear idea of the technology that will be needed? Does is seem to you that the entire SDI is set up on this horse race philosophy - that is, let every technology race as fast as it can? Is this really the best way to run the program - throw money at every research project even if many of them won't produce anything useful?

ANSWER 12:

The horse race concept is appropriate when speed is valued more highly than efficiency. It is difficult to get very far in systems architecture studies when the basic technologies have yet to be demonstrated and plausible basing concepts validated against offensive countermeasures. However, systems studies are relatively cheap and help build political support from many defense contractors around the country. As the Stanford workshop recommended, it will be important to identify technologies to be terminated as not promising, and this work should be done with due care and deliberation as required by a good research program. Furthermore, technology demonstrations are costly in both financial and intellectual resources - neither of which can or should be squandered.

QUESTIONS SUBMITTED BY SENATOR ANDREWS

QUESTION 13 - ARMS CONTROL REGIME:

Dr. Garwin, in the DOD publication, SOVIET MILITARY POWER, there is a chapter devoted to Soviet strategic defense and space programs. The chapter shows how the Soviets are making major improvements in strategic defenses and ABM-related developments.

In general terms, Dr. Garwin, can you outline for this subcommittee some arms control regimes that might be mutually agreeable for the U.S. and Soviet Union, and that could contain these technology developments from becoming reality?

(The question above could also be asked of Ambassador Gerard Smith, Dr. Sidney Drell, Dr. Colin S. Gray, and Dr. Robert Jastrow.)

ANSWER 13:

Full compliance with the SALT I ABM Treaty is essential to an arms control regime in our mutual interests. Ambiguities such as the definition of "components" as limited by Article V should be resolved by discussions at the Standing Consultative Commission (SCC). The SCC should also address newly developing ambiguities about theatre, or tactical, ballistic missile defense with limited capabilities against long range strategic ballistic missiles. The SCC, furthermore, should resolve possible compliance issues raised by radar modernization and construction such as the Krasnoyarsk radar in Siberia. But, beyond this, limitations on weapons in space will have to be negotiated so as to maintain a clear line between allowed space-based sensors and warning platforms which might otherwise be seen as components of ABM systems. I believe this will require a limit on space-based ASATs and testing of ground-based ASATs against targets in space.

During the questioning following my testimony Senator Rudman asked me to respond in writing for the record about the assessment of compliance as discussed in Appendix B of the 1985 DOD Report to the Congress on the Strategic Defense Initiative. The DOD Report classifies the major SDI experiments in three categories:

Category 1 - Conceptual Design or Laboratory Testing

Category 2 - "Field Testing" of Devices that Are Not ABM Components or Prototypes of ABM Components

Category 3 - "Field Testing" of Fixed Land-Based ABM Components

The Report states that the *"SDI research program is being conducted in a manner fully consistent with all United States Treaty obligations"* and assigns overall responsibility for assuring Treaty compliance to the Undersecretary of Defense for Research and Engineering.

Whereas experiments in Categories 1 and 3 can be pursued clearly in compliance with U.S. Treaty obligations, the consistency of Category 2 experiments is not so clearly established. As described in the Report, these experiments will be performed by disaggregating "components" into individual subcomponents or by reducing parameters of the test below ABM capabilities, or by testing against cooperative targets - viz. as ASATs - rather than against offensive warheads or boosters. However, what is the required degree of disaggregation, and how can we establish suitable limits on the test parameters so that Articles V and VIa of the ABM Treaty are not being violated? The issue here is particularly ambiguous for those Category 2 experiments such as the space-based kinetic kill vehicle and the space-based railgun for which the experiments have yet to be defined, as stated in the Report. Since the compliance issue is both sensitive and important for these experiments, I emphasize the importance of Congress establishing the independent oversight panel that I recommended in my testimony. This independent panel of experts can assure full and clear compliance with U.S. Treaty obligations as these activities are further defined and advanced. In an issue of such central importance to U.S. security and arms control planning and goals I think such independent oversight accountable directly to Congress and independent of DOD itself is essential.

IBM CORPORATION

STATEMENT OF RICHARD GARWIN, THOMAS WATSON RESEARCH CENTER, IBM CORPORATION

BIOGRAPHY OF WITNESS

Mr. **GARWIN**. I am Richard Garwin from the Thomas Watson Research Center, IBM Corp.

Mr. Chairman, I am grateful for the opportunity to present my views on the Strategic Defense Initiative, and I look forward to responding to your questions.

I hope I may be allowed to submit for the record responses to any questions which may come from the following witnesses in regard to things on which I speak.

Of course, I speak for myself alone and not for any organization or group. As a consultant for various elements of the U.S. Government, and as a member of the advisory committee to the Office of Technology Assessment, with others of varying views advisory to the OTA staff preparing a report on the SDI, I have had the opportunity to come to an informed judgment on this program.

In addition, as indicated in the my brief biography, I have long been involved in national security and weapons program for the U.S. Government and have contributed to many of them, including the hydrogen bomb, the air-launched cruise missile, and many military space activities, up to the present time.

[The biography of Mr. Garwin follows:]

BRIEF BIOGRAPHY OF RICHARD L. GARWIN

Richard L. Garwin was born in Cleveland, Ohio, in 1928. He received the B.S. in Physics from Case Institute of Technology, Cleveland, in 1947, and the Ph.D. in Physics from the University of Chicago in 1949.

After three years on the faculty of the University of Chicago, he joined IBM Corporation in 1952, and is at present IBM Fellow at the Thomas J. Watson Research Center, Yorktown Heights, New York; Adjunct Research Fellow in the Kennedy School of Government, Harvard University; Andrew D. White Professor-at-Large, Cornell University; and Adjunct Professor of Physics at Columbia University. In addition, he is a consultant to the U.S. government on matters of military technology, arms control, etc. He has been Director of the IBM Watson Laboratory, Director of Applied Research at the IBM Thomas J. Watson Research Center, and a member of the IBM Thomas J. Watson Research Center, and a member of the IBM Corporate Technical Committee. He has also been Professor of Public Policy in the Kennedy School of Government, Harvard University.

He has made contributions in the design of nuclear weapons, in instruments and electronics for research in nuclear and low-temperature physics, in the establishment of the nonconservatin of parity and the demonstration of some of its striking consequences, in computer elements and systems including superconducting devices, in communication systems, in the behavior of solid helium, in the detection of gravitational radiation, and in military technology. He has published about 100 papers and been granted 27 U.S. patents. He has testified to many Congressional committees on matters involving national security, transportation, energy policy and technology, and the like. He is coauthor of the books *Nuclear Weapons and World Politics* (1977), *Nuclear Power Issues and Choices* (1977), *Energy: The Next Twenty Years* (1979), and *Science Advice to the President* (1980).

He was a member of the President's Science Advisory Committee 1962–65 and 1969–72, and of the Defense Science Board 1966–69. He is a Fellow of the American Physical Society and of the American Academy of Arts and Sciences; and a member of the National Academy of Sciences, the Institute of Medicine, the National Academy of Engineering, the Council on Foreign Relations, and the American Philosophical Society. The citation accompanying his 1978 election to the U.S. National Academy of Engineering reads "Contributions applying the latest scientific discoveries to innovative practical engineering applications contributing to national security and economic growth." He was awarded the 1983 Wright Prize for interdisciplinary scientific achievement.

He is a member of the Council of the Institute for Strategic Studies (London), and during 1978 was Chairman of the Panel on Public Affairs of the American Physical Society. He is a member of the Council of the National Academy of Sciences.

His work for the government has included studies on antisubmarine warfare, new technologies in health care, sensor systems, military and civil aircraft, and satellite and strategic systems, from the point of view of improving such systems as well as assessing existing capabilities.

SDI AS DETERRENT POLICY

Mr. GARWIN. In his speech of March 23, 1983, President Reagan noted that deterrence of nuclear war by threat of retaliation worked and would continue to work. He asked, though, whether the American people could live secure by substituting defense for deterrence, and he expressed confidence that our scientists could find the means to render nuclear weapons impotent and obsolete, intercepting strategic ballistic missiles before they touched our soil or that of our allies.

Because of potential countermeasures which could be taken by the other side, it is generally agreed that we cannot plan for a defense so competent that it could eliminate the ability of the Soviet Union to destroy United States society, and, therefore, we shall have to retain our offensive forces indefinitely, taking also the measures to ensure that they can penetrate any defenses which the Soviets might construct independently, or which could evolve on their side from the findings of our program of SDI.

Testimony of administration witnesses has indicated that there is nothing in the SDI Program which will support this goal of replacing deterrence of nuclear war, except possibly that 5 percent which is to be reserved for far-out ideas, unforeseeable at present.

SDI BUDGET PROPOSAL

Of course, the SDI is characterized as a research program, of perhaps 10-year duration, for which more than $20 billion is requested for this 5 years, with perhaps $50 billion for the next 5 years.

According to the Fletcher Committee, at that time we should know enough to decide whether we want to make the investment in real development of the hardware and software, deployment and operation of a strategic defense system against ballistic missiles.

But whether one takes the first step on a journey to China depends on whether one wants to go to China, and on the odds of success. A 1-year step of $3.7 billion is a significant fraction of defense research, and of the scarce talent in our Nation and allied nations available for improving our security.

It behooves us to look carefully at the desirability of the outcome and the likelihood of success.

Donald Kerr, speaking at the Ohio Wesleyan University stated that the increase in the SDI budget from $1.4 billion of last year to the $3.7 billion would consume 40,000 additional scientists and engineers.

The SDI is now presented as a program of investigation toward the goal of strengthening deterrence rather than replacing deterrence. It could strengthen deterrence by reducing the vulnerability of our land-based forces—Minuteman or MX in vulnerable Minuteman silos.

It is reputed to be able to strengthen deterrence not only by strengthening the retaliatory forces in this way, but also by denying the Soviet Union confidence in the achievement of limited military goals, so they won't even try to achieve those goals.

ACCIDENTAL LAUNCH

And some supporters of the SDI hold it absolutely essential because it is needed to counter accidental launch of one or a few Soviet missiles, or to nullify one or a few ICBM's in the hands of a rogue nation. Every one of these partial goals can be achieved sooner and at less cost and less risk outside the context of SDI than within.

Let me explain. As for accidental launch, we do not have to wait 10 to 15 years to be protected by a star wars system. The nightmare is that the Soviet Union will call up to say "We are very sorry, but one of our ICBM's has just been released by accident. It will impact in the United States in 30 minutes, and there is nothing you or we can do to stop it."

Each one of our own ICBM's or SLBM's in test is fitted with a command destruct link, which allows the range safety officer to destroy the missile if it heads off range. This small device has a secure (secret) message for each particular missile, which when transmitted to that missile will destroy it.

To counter accidential launch as soon and as cheaply as possible, we should begin to equip our operational weapons with this command-destruct link, and encourage the Soviet Union to do likewise. This is a field in which the two sides should certainly be willing to cooperate, since, by definition, neither wants to destroy the other side accidentally.

We could counter possession of an ICBM by a rogue nation, by covert action--for which purpose it would be thoroughly justified. We could also very quickly arrange to reprogram one of our Minuteman II missiles with its single nuclear warhead, which may have a usual target (a silo or other point a quarter world away) which it can strike with an accuracy much better than a kilometer and within a very short time uncertainty.

That same Minuteman II could intercept with its nuclear warhead the rogue nation ICBM on its way to the United States, at a safe distance of 1,000 kilometers or more from our shores. Such a capability could surely be available within a year, as contrasted with a decade or more for any of the satellite-based technologies.

DEFENSE OF MINUTEMAN SILOS

The defense of Minuteman silos has long been feasible, by intercepting the reentry vehicles within the atmosphere as they approach the silos, as suggested by Dr. Drell. A star wars system of intercept in boost phase deep within the Soviet Union, or in midcourse, attempts to gain leverage over terminal defense of cities, but it gives up the enormous leverage which accrues to a terminal defense of hardened silos.

SILO SURVIVAL

An adequate number of silos can be made to survive by any one of a number of terminal defenses.

Buried nuclear explosives 1 kilometer north of each silo, triggered as the RV approaches that silo.

Swarmjet rockets launched by the many thousands from a rocket launcher right at the Minuteman silo.

Or the nuclear-armed LoADS [low-altitude defense system] of the Ballistic Missile Defense Program Office.

But we should not lose sight of the recommendations of the Scowcroft Commission, in its final report of March 1984, when asked to review the SDI in the context of the overall U.S. strategic program.

SCOWCROFT COMMISSION RECOMMENDATIONS

The Scowcroft Commission did not advocate any role for defense, but maintained that our future security needs would be met by the development of a small, single warhead midgetman ICBM to follow the MX and the other MIRVed land-based missiles.

They advocated also a small strategic submarine to carry fewer warheads then the present Trident or Poseidon submarines. I thoroughly support these recommendations and urge that Midgetman development be speeded and a commitment made to deployment of 450 Midgetmen in the Minuteman II silos, in addition to whatever mobile deployment appears necessary.

Furthermore, we should have a program for developing means for a rapid and inexpensive deployment of small silos of modest hardness, so that we will be prepared, if necessary, to run a warhead race with the Soviet Union, deploying as many single-warhead Midgetmen in silos as the Soviet Union builds additional accurate warheads. Obtaining that kind of information on how to build these systems threatens no one and is a prudent hedge.

SMALL STRATEGIC NUCLEAR SUBMARINE

The small strategic submarine is long overdue. Dr. Drell and I proposed in the late 1970's the use of small submarines for survivable deployment of the MX missile, and it is an even easier task to prepare ourselves for the prospect of major reductions in offensive weapons, by the actual development of submarines suitable for the economical basing of perhaps eight warheads each.

And I have long advocated the development of the buried explosives and the Swarmjet, or clustered Swarmjet, silo defense schemes, again as a hedge against the need to defend the ICBM's, and to expand the choices available to us.

There seems to be some confusion as to the place of silo defense in the SDI. The President's Science Adviser, Dr. George A. Keyworth, says tht silo defense would be "funded out of the strategic modernization program" and is not part of SDI.

Yet according to Principal Deputy Assistant Secretary of the Army, Dr. A. Hoeber, all the work of the Army Ballistic Missile Defense Program Office [BMDPO] falls within the SDI Program. But as the Scowcroft Commission emphasized, it is not necessary that every portion of the strategic retaliatory force be invulnerable. Indeed it is unachievable.

Not that the 40 percent of our strategic submarines in port at any time are totally vulnerable to destruction. Yet the force is sized so that the surviving 60 percent is adequate for our needs.

The caution of the Scowcroft Commission toward strategic defense of Minuteman arises from their reluctance, and mine, to deploy a defense beyond that allowed by the ABM Treaty, which would then permit the Soviet Union to build an unconstrained defense of nuclear-armed interceptors across their vast country, to which we would have to respond with augmentation and modification of our offensive force, as well as, very likely, with a broad and useless defense of our own.

It is this fruitless and dangerous offense-defense race which was stopped by the ABM Treaty of 1972, and as regards the desirability of silo defense, nothing has changed since then.

SALVAGE FUZING

Incidentally, because of the likelihood of "salvage fuzing," the use of nonnuclear armed interceptors for terminal defense does not eliminate the problems the defense will have in operating in the presence of large fireballs from attacking nuclear weapons—a far more serious problem than the small fireballs from the nuclear-armed interceptors themselves.

We should not shoot ourselves in the foot by abandoning the potential of nuclear armed intercepts.

PROBLEMS OF COUNTERMEASURES WITH STRATEGIC DEFENSE SYSTEMS

The problems with strategic defense systems is not primarily technology, nor even, in itself, costs. The problem in countermeasures. This has been recognized by Paul Nitze in his February 20 speech, in which he states that no defense could be deployed which was not survivable, and cost-effective at the margin.

This latter means that it must cost less to augment the defense to nullify an increment of offense, than to build that additional defense designed to counter the defense.

Those who suggest that the Soviet Union will not try as hard and effectively as it can to counter a defense which in effect disarms it are not referring to that same Soviet Union which has spend $10 billion annually on an operating air defense system, still ineffective in denying access to Soviet targets even by our old B-52 bombers.

They are not describing a Soviet Union which has spent vast sums on hardened silos to prevent our acquiring a capability for disarming strike. These countermeasures can be characterized as "active," "passive," or "threatening."

The active countermeasures are those which attack the defense by destroying it, blinding, it, or otherwise disabling it.

Passive countermeasures include hardening of the boosters, hiding, and the like.

Threatening countermeasures include the augmentation of the strategic offensive force, or its retargeting to cover redundantly the more valuable targets, in the expectation that some of the weapons will be lost to the defense.

In fact, the countermeasures will result in the increase in the threat and in increased destruction of our society if war comes. It is, of course, very important for the United States to have a full stock of knowledge about countermeasures to potential Soviet defenses. and I strongly support such a program on penetration aids, broadly construed.

I have time for only one example of an active countermeasure, and one of a threatening countermeasure. The active countermeasure is one which would be used against the near term space-based BMD system proposed by Brzezinski, Jastrow, and Kampelman in their "New York Times Magazine" article of January 27.

The space-based element of that system is to be 100 satellites, each carrying 150 rockets for boost-phase intercept, with each rocket weighing 500 pounds and carrying a 10-pound homing warhead.

If the system worked perfectly and were not countered by space mines in orbit to destroy the defensive satellites, or by other means, it would be designed to have enough satellites within 2,000-kilometers reach of the Soviet ICBM fields at the moment of firing the ICBM's, so that the individual rockets could seek out and destroy Soviet ICBM boosters in boost phase above the atmosphere.

But the countermeasures to this system already exist in the form of the nuclear-armed Galosh ballistic-missile-defense interceptor which the Soviets have depoyed around Moscow for more than 15 years. The Galosh burns out in some 30 seconds too short a time to be reached by any of the satellite-based rockets.

Its warhead would emerge from the atmosphere, protected by a shroud, and would float into space, up to 10 kilometers or so from the satellite it is to destroy. It would be invisible to satellite or rocket sensors destined for the brilliant flame of boost phase, and even if seen, it could not be attacked by the rocket if it had tethered to it a number of balloon decoys of a distance of 10 meters or so.

Thus a system which we would not have for at least 6 or 8 years and $60 billion investment, according to the authors, would be vulnerable the day it was deployed to countermeasures which the Soviet Union would have had in being for more than 20 years.

This is only one example of the vulnerability of space-based defenses, a vulnerability so severe that Edward Teller, otherwise a strong supporter of strategic defense, has said repeatedly that we cannot base a defense in space because "satellites are costly to put up and cheap to shoot down."

ADVANCED BMD SYSTEM

Now, consider a much more advanced BMD system which one might hope to deploy in 20 or 30 years. This would consist of large satellites, each carrying a 25-megawatt laser, with a beam focused on the target via a mirror on the satellite of diameter 10 meters, about as big as this room.

Of course, the Soviet response to such orbiting battle stations would be to place next to each a small space mine, but let us ignore that for the moment.

The Soviet Union has shown itself willing to make substantial expenditures in the past in order to maintain the viability of its strategic offensive force. It would not be adverse to augmenting its strategic force by the deployment of 3,000 single-warhead Midgetman missiles, or ones with three warheads, based in such a way as to require as many of these satellites as possible to handle the ICBM force.

Unfortunately for the defense, satellites have the characteristic of being elsehwere in the world most of the time, except those at a distance of some 40,000 kilometers in geosynchronous orbit. These laser battle stations must be in low Earth orbit in order to be close enough to destroy boosters by overheating them.

This figure shows the number of satellites in orbit worldwide which would be required to counter 1,400 or 3,000 of these Midgetman missiles based in a region the size of Ohio, with various assumptions for missile boost time, 40 to 100 seconds, and satellite retarget time.

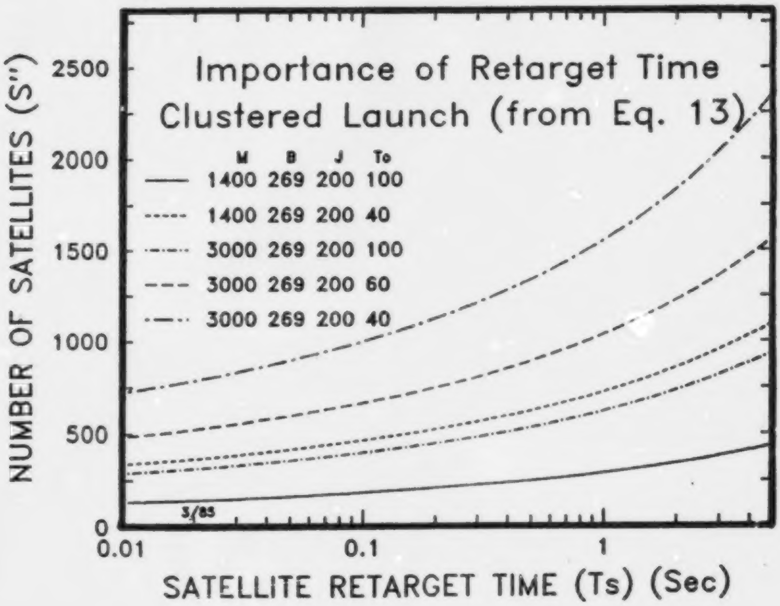

FIGURE 1

(NOTE added by R. L. Garwin: Figure 1 is from "How Many Orbiting Lasers for Boost-Phase Intercept?" in Nature, May 23, 1985)

MISSILE ACCURACY

Mr. **Garwin**. Note that more than 2,000 satellites would be required to handle a force of 3,000 missiles of nominal hardness, 200 megajoules per square meter, for this standard, but, of course, not yet demonstrated laser, if the missile booster time is designed to be 50 seconds (40-second engagement time), and if the satellite can point with exquisite accuracy in 5 seconds.

The accuracy required is about that of the Hubble space telescope, which would take about 5 minutes for the same job. The goal, or actually hope, of the SDI Program Office is a 0.1 second retarget time, and from the figure you can see that it would take more than 1,000 satellites if the SDI Program Office achieves its very ambitious goal.

It is wrong to imagine that the United States is an infinitely rich country and the Soviet Union an infinitely poor country. Fence the criterion that the defensive system be cost effective at the margin.

In his presentation of August 9, 1984, to the House Republican Study Committee, Dr. Robert Jastrow wrote "Every laser-equipped satellite will cost about as much as a Trident submarine, several billion dollars."

MIDGETMAN MISSILE

The fast-burn Midgetman, according to studies done for the Fletcher Committee by Martin-Marietta and McDonnell Douglas Corp., would cost perhaps 15 percent more than a missile built without fast-burn characteristics in mind.

Procurement and 10-year operation of a fast-burn Midgetman might cost $10 million each. Requiring one satellite for every three such Midgetmen, if the SDI achieved its very aggressive goal, is an egregious violation of the cost-effectiveness criterion.

But the vulnerability of a $1 billion satellite to a $1 million sapce mine is even more discouraging and that is why I join with the others in the workshop in urging the elimination of the chemical lasers from the program.

[Table 1 follows:]

The leverage of countermeasures can be seen from the following Table, taken from a forthcoming report:

Table 1. Required satellite densities s and numbers S.

M boosters	J MJ /m²	T_o sec	T_s sec.	s' Sats. /(Mm)²	S' Sats.	s'' Sats. /(Mm)²	S'' Sats.
1400	200	100	3	4.24	697	2.32	381
1400	200	40	3	10.54	1732	5.80	953
3000	200	40	3	22.5	3699	12.43	2044
1400	200	100	0.5	0.89	146	1.53	251
1400	200	40	0.5	1.96	322	3.82	628
3000	200	40	0.5	3.97	653	8.16	1344
3000	200	100	0.5	1.71	281	3.27	537
1400	200	100	0.1	0.48	79	1.14	187
1400	200	40	0.1	0.84	138	2.85	468
3000	200	100	0.1	0.76	126	2.44	401
3000	200	40	0.1	1.39	228	6.10	1003

```
                          ------|-------              --------|-----
                                |----------------------|      |
                                                       |      |
Boosters distributed over 10 (Mm)² (solution of I-22):-|      |------|
  (Lasers assigned local areas of responsibilty)       |      |------|
  (flat earth, satellite numbers will be greater than shown)         |
                                                                     |
Concentrated boosters with horizon cutoff on satellite effectiveness:|
```

(round earth, solution of (I-13), optimum altitude $h^3 = (BT_s/J)$)

For Ts = 3, 0.5, 0.1 sec, h is 2010, 820, or 370 km, respectively.

The point-launch approximation holds for $G \leq h$, where G is the diameter of the launch field.

CLUSTERED LAUNCH

Mr. GARWIN. Since the Soviet Union is unlikely to want to make our defensive job easy, the satellite numbers in the final column are far more relevant than the approximate calculation for "distributed boosters."

These are numbers relating to clustered launch, not in a densepack configuration, but in a region the size of the State of Ohio. So the small numbers that one can calculate, ignoring target time and for distributed boosters, are irrelevant to the time when satellites might be available for this job.

As for the President's goal and the differing goal of the SDI Program, I quote the words of Dr. William J. Perry, former Under Secretary of Defense for Research and Engineering, "What is desirable is not feasible; what is feasible is not desirable."

Our security would be improved by a program in ballistic missile defense research which emphasized penetration aids, and awareness of what the Soviet Union might be able to build, rather than a program for developing and demonstrating such abilities ourselves.

The President was serene about the effectiveness of deterrence. Recent arguments that the SDI is needed because the Soviets have one, too, that our deterrent force cannot remain effective, so we must change to defense, are misguided and incorrect. They are the kind of background music that accompanies every request for funds.

We who live in the glass house of deterrence should not throw stones. Nor should we demonstrate improved ways of throwing stones.

ADHERENCE TO ABM TREATY OF 1972

During the many decades over which we will have to rely on deterrence of nuclear war by threat of retaliation, our security and that of our allies will be best maintained by strict adherence of the Soviet Union, and ourselves, to the ABM Treaty of 1972, by effective use of the Standing Consulation Commission [SCC] of that treaty to ensure the limitation of the new technologies which are indeed strongly limited by the treaty.

ASAT TESTS

That treaty regime must be reinforced by a ban on antisatellite weapons tests and on space weapons, so that neither side can perform the early stages of a BMD technology program in the guise of ASAT tests.

That this is an urgent matter is indeed supported by the suggestion of Dr. Keyworth that the Soviets "would put two and two together" from observations of an ASAT capability that he advocates from ground-based lasers against satellites in geosynchronous orbit, and would realize that we were well on our way to a BMD capability using the same technologies.

The administration's "Report to the Congress on the SDI—1985," published after I prepared this testimony, makes it an even more urgent matter to eliminate the ASAT guise for the Soviet Union or the United States in the development of BMD technology.

AVAILABLE

As ASAT test ban would reduce the peacetime threat to our satellites, and its absence is likely to lead to a confrontation of weapons themselves in space—as satellites acquire antagonistic space mines, and means are taken to counter those space mines—an explosive combination of weapons in the same place at the same time, ready to destroy one another at a moment's notice.

I urge you to hold the SDI Program to the current level of $1.4 billion, emphasizing those aspects presented in the workshop report by Dr. Drell.

I urge you to support a moratorium on tests of ASAT weapons, so long as the Soviet Union abides by its self-proclaimed moratorium.

I ask you to support the urgent negotiation of a ban on ASAT tests and on space weapons, to buttress the constraints against the erosion of our retaliatory capability, on which we will have to depend for a long, long time.

Thank you for your courtesy.

Senator **Rudman**. Gentlemen, thank you very much for that superb testimony.

ADDRESSING CONFLICT OF VIEWS

I have a few questions. Let me assure you these questions are not intended to agree or disagree with you because, frankly, I don't know if any Members of the Senate technically would attempt to do that.

We do have quite a conflict in the views of very distinguished and esteemed people like yourselves and we have to resolve that conflict in our own minds. That is our system. It is a very difficult one to arrive at, particularly on this issue in which there is such divergence.

Let me at least try to focus on a few issues that you all raised and then yield to my friends, Senator Proxmire and Senator Sasser.

SATELLITE INVENTORY

I want to ask you, Doctor, about your comment about the number of satellites. Very recently there was an article in "Commentary" by Dr. Jastrow who is going to appear here shortly—and he criticized the original assumptions made by, I think, you and others about the number of satellites in an installation.

He concluded that fewer than 100 would be required, not the 2,400. Now we understand there is some convergence between the SDI Program Office itself and UCS on the number of satellites.

Could you tell me, is there something new in that area?

The question is asked not so much to get a specific answer to that, but more to kind of test the dynamics of this continuing debate because it seems to be a shifting target addressed to that one issue.

There seems to be a major disagreement among people who ought to be able to agree, since I assume you took mathematics at the same time.

Mr. **Garwin**. There is a campaign to put words in other people's mouths. We can talk about the numbers, but I cannot agree with the people who claim I agree with them.

Senator **Rudman**. We understood now there is an agreement?

Mr. **Garwin**. There is no agreement. If we calculate the same thing, we get the same numbers. The difference is what is the relevant calculation?

The SDI Program Office and Dr. Canavan from Los Alamos and Dr. Jastrow tend to focus on 1,400 slow-burn boosters deployed over the Soviet Union. That is sort of what the Soviet Union has now. It makes no sense to imagine that in the year 2000 or 2010 the satellite system will be facing those boosters which will have died from old age.

So, we have always considered the important case to be one which stresses the defense, and in that we agree with the Fletcher Committee in the very beginning. I am not talking for UCS or any other group. So, the numbers I give you are the very best numbers. These are the only published numbers which include the important retarget time.

Dr. Jastrow in his reply to our letter in "Commentary" magazine in March 1985 on page 19 says:

> A retarget time of a tenth of a second would indeed be difficult to achieve if the experts were planning to rotate the mirror mechanically to redirect the beam from one Soviet missile to another. But the Star Wars program is probably not going to do that. Part of its funding is going into research on an extraordinary new technology.

That is far-out technology. They are not counting on that at all. That is a misstatement of the program.

So, if you cluster your boosters, there is no dispute that you require for that assumed satellite and for that assumed hardness 1,000 satellites worldwide, which Dr. Jastrow himself characterizes as several billion dollars each.

I have never given a number for satellite cost.

YEAR 2000 GENERATION SOVIET ICBM

Senator **Rudman**. Are those calculations essentially based on what you would look at as a reasonable year 2000 generation Soviet ICBM?

Mr. **Garwin**. Absolutely.

Senator **Rudman**. Of the fast-burn variety?

Mr. **Garwin**. Absolutely.

Senator **Rudman**. As you use fast-burn and retarget numbers that you assume are reasonable for the year 2000 vis-a-vis what others use for the year 1985, it is your assumption that their numbers are all wrong because their underlying asssumptions are based on current data rather than what is future data which you think reachable?

Is that your point?

Mr. **Garwin**. I don't believe these satellites are reachable. I don't believe we will achieve a 10th-second retarget time, but it is not impossible.

I do believe it is totally feasible by the year 1995 for the Soviets to have a single-warhead, silo-based, fast-burn booster. Not only I but General Toomay, deputy chairman of the Fletcher Committee, says that the critics that claim the Soviets cannot achieve fast-burn ICBM's by the year 2000 are wrong by a factor of two in time.

The Soviets have in hand fast-burn technology and there must be a confusion in the mind of those who advise the Deputy Secretary of Defense, William Howard Taft, who transmitted some criticisms to the Office of Technology Assessment.

This is in General Toomay's letter of June 22, 1984. He says:

> Fast-burn booster payload and countermeasure capability penalties should be slight.

FAST-BURNING MISSILES

Senator Rudman. Let me ask you just two more questions on that particular point. Again, the questions are asked only in terms of trying to get a point counterpoint to some other testimony we have had. Let me get into this whole fast-burning area. First, a very simple question.

Your knowledge of the Soviet industrial technology and their scientific community has to be rather substantial considering your line of work and what you have done.

Do you feel they possess the kind of capability to make a 1995 to year 2000 fast-burning technology deployment reasonable?

Mr. Garwin. Yes; without any doubt. That is an engineering project. You could let a contract right now and you would have your system deployed in 6 years.

Senator Rudman. You believe they have that capability?

Mr. Garwin. Yes; because they have the fast-burn boosters in their interceptor missiles. You cannot both believe that they have a good ABM capability with conventional nuclear armed interceptors of high acceleration capability and believe that they would have trouble making ICBM's with considerably less acceleration.

We are far ahead of the Soviet Union in every technology of importance to strategic defense. We will still not be able to make a decent strategic defense. But the conventional old-fashioned technology of fast-burn boosters they have plenty of.

CRITICISM ON OTA ASSESSMENT

Senator Rudman. Having answered that, let me go into three statements from General Abrahamson's statement when he criticized last year's OTA's assessment.

The first statement is:

> It will be well into the next century before the Soviets can develop and deploy at a significant cost fast-burn boosters.
>
> Two, fast burn boosters will result in significantly reduced ICBM payloads, fewer warheads, be less accurate, be less capable countermeasures against later phases of BMD.
>
> And three, there are new technologies to be developed in time to counter fast-burn boosters if they pose a significant threat.

Here are three statements in total counterpoint that we are hearing from you.

Mr. Garwin. The first two are wrong. The last one is misleading.

The Star Wars Program is the greatest example of a "fallacy of the last move." By assumption, one states one will be able to counter the existing force which, of course, will not be there when we have a star wars defense, because we are supposed to work for 10 years in research and then decide to build something.

It will be the year 2000 or longer before we have a significant defense. This is the administration's policy; this is what Paul Nitze, speaking for the administration in a speech cleared by the Secretary of Defense, Joint Chiefs, White House, State Department, and so on, states.

Now, the first two points—let me quote from an expert—General Abrahamson, although a fine general officer, is new to this field. I will quote again from General John C. Toomay, Deputy Chairman of the Fletcher Committee, writing in response to exactly those criticisms on June 22, 1984. He says:

> The pace at which the Soviets would develop and deploy such a system of fast-burn boosters is more or less in their hands since they and we have developed and deployed major missile systems in 6 to 10 years, depending on perceived urgency. The 20-year estimate seems at least a factor of two out of line.

So, he says it could be 10 years or less.

> The statements about fast-burn boosters having less payload, less RV's, less accuracy, less capability to countermeasure, following phases imply the authors are confused between the fast-burn boosters and hardened boosters. Fast-burn boosters payload and countermeasure capability penalties should be slight.

I should give his opening sentence in order to be fair to General Toomay. He says:

> The Department of Defense Comments on Directed Energy Missile Defense in Space (May 8, 1984) is not a competent document. It contains falsehoods, irrelevancies and misinterpretations.

Senator **Rudman**. I have one other question.

COMPONENT COST OF PROGRAM

You obviously are well aware of the component cost of this program and historically where it all was before the President announced SDI.

Were you making a recommendation expressing the general philosphy—I guess the three of you agree in terms of what we ought to be doing—to make sure we protect our flanks, so to speak, and continue forward on these programs?

What do you think is a reasonable number that the scientific community and engineering community can absorb over the coming year as opoosed to what the administration has before this committee? What is your number?

Mr. **Garwin**. My number is $1.4 billion. You will not create any capability for doing research. You will take it from things that are more important.

What has happened here is that the President in a very sincere heartfelt statement in March 1983 has launched us into what he thinks is a program to eliminate offensive missiles. That is not being worked on.

So, every dollar that goes into star wars is not in support of the President's goal. It is in support of an unnecessary goal of strengthening deterrence, which is plenty strong and is best strengthened in other ways.

Senator **Rudman**. That sum, incidentally, is coincident with last year's number.

Mr. **Garwin**. That is right.

1985 REPORT ON SDI

Senator RUDMAN. Dr. Drell, I don't want to read it completely, but I am sure you have read the report to Congress on SDI, 1985.

Mr. DRELL. I have it here.

Senator RUDMAN. In appendix B, entitled "Compliance with the Strategic Defense Initiative with ABM Treaty," I wonder rather than take up a lot of time here if you might do something for the record for the committee.

On page B-1 of that, B-1 cf. 2, Policy, following that on page B-1 and on page B-2 there are a number of declarative statements that essentially reach the conclusions that are quite opposite from your conclusion, that is, that the activities are quite in accord with the current ABM Treaty and its interpretation. You obviously disagree with that.

Could you examine that document and answer briefly if you wish now?

I would like an extensive answer in writing from you addressing the points made here because I think it is very important.

Mr. DRELL. Thank you. I welcome that opportunity.

Let me say I read this and I called attention to the fact that in this describing of the 15 different tests in categories I, II, III, they say, well, details are not worked out for things yet to be determined.

I think they recognize quite head on, and I welcome it, the issues of treaty compliance of these 15 tests. They have modified some tests to make them from space to ground in order to avoid obvious difficulties with compliance.

But then when they talk about some tests involving sensors at levels below the ABM capability, they leave open the question of how anyone would verify that, for example. That is just one instance.

They talk about disaggregating system components which are forbidden by the ABM Treaty as clarified in Ambassador Smith's testimony in 1972.

The question is how far you can disaggregate components of an ABM system? How much disaggregation is there?

I would say it is not a disagreement. I think they recognize the gray area involved here.

I will be very glad to review that. I would like to make clear it is not a disagreement.

I must say at least up to now this committee gets, at least I get, the impression that they are making every effort to stay within that treaty.

What you are also saying is that it may be impossible to do that. We will hear from the other witnesses to see what they think.

If you will answer for the record in greater extent, I would appreciate it.

Mr. DRELL. My testimony is to urge the Congress, through its oversight capacity, to see that the effort is indeed consistent with the treaty. I think they are making the effort.

Senator RUDMAN. Senator Proxmire.

Senator PROXMIRE. Thank you very much.

ORIGINAL ABM TREATY

Ambassador Smith, you negotiated the original ABM Treaty, I believe; is that correct?

Ambassador SMITH. Yes.

Senator PROXMIRE. You are consulted now, I understand, by the administration as to the intentions at the time of the agreement in the treaty and other Asat matters from time to time.

Ambassador SMITH. I have not been consulted. I am consultant to the OTA on their studies to the Congress, but not for the administration.

Senator PROXMIRE. I would like your comment. These things happen so fast I am not sure what is what. Yesterday's New York Times, in an article by Bill Teller, it was reported the Department of Defense has issued a broad interpretation of the 1972 treaty on antiballistic missiles that would clear the way for extensive testing of weapons designated under star wars.

The Department of Defense also said, according to the New York Times article, it would reserve the right to disregard the provisions of the treaty in reprisal for reported Soviet violations, raising the possibility that experiments would proceed even if they did not comply with the treaty.

Now, an official is quoted as saying if one party to a treaty violated it under international law, the other party to the treaty could respond by announcing its intention to violate other parts of the treaty. This might occur not in the next year or two, but in 1988 or so.

Frankly, I can't think of a surer way to destroy arms control than to proceed on this kind of basis. I would like to get your comment as the man who negotiated this treaty and what your conclusions are.

Ambassador SMITH. Senator, one of the main aims in Geneva is to prevent erosion of the ABM Treaty. When I read that report in the Times yesterday I said to myself, this is a curious way to go about preventing erosion of a treaty.

I have not read the report which was the subject of that news account. But from the news report, it seemed to me that this is a clear case of exploiting loopholes.

The ABM Treaty did not cover ASAT. The administration, if I understand it correctly, is planning to test some of these subsystems in an ASAT role and say, well, we are not violating the ABM Treaty. Then they plan to take the findings from those tests and apply them to an antiballistic missile system.

To my mind that is not the way we should treat treaties. I think it is a very cavalier way to treat treaties. We are looking for ambiguities, we are exploiting loopholes. At the same time we are piously saying, but all of this is treaty compliance.

I think also that in admitting now that we are going into a testing phase we are destroying our argument that this is just a research phase that we are in. If we are going to do this testing, it is hard for me to understand the English language if we used it to call it test research.

TESTING VIOLATIONS

Senator **Proxmire**. If we go into a testing phase, is it your judgment it is a violation of the treaty you negotiated?

Ambassador **Smith**. If we test something that is designed for a space-based system, it flatly violates the treaty.

Senator **Proxmire**. How about the argument they make that the Soviets have violated the treaty with their radar station at Krasnoyarsk and, therefore, we have a right to violate the treaty in other respects since the treaty has already been violated by the other party?

Ambassador **Smith**. I am not an international lawyer. I understand there is one school of opinion that says in treaties if one party violates the treaty, the other party can take corrective action in the form of doing something that is not permitted by the treaty.

I hope we don't get ourselves into that shyster approach to handling treaties.

I would like to add one further thought. We have worked on rather reluctant allies in Europe to join this venture and we have largely said it is just research and it is all right. I think as the European allies see what we are doing in the way of getting out beyond research, they are going to have second thoughts about whether they should participate in something that to my mind is clearly in violation of treaty.

RESEARCH IN SDI AREA

Senator **Proxmire**. You, yourself, testified earlier that you supported research in this area, but that the research could be conducted within the limits of the ABM Treaty.

Is that correct?

Ambassador **Smith**. That is correct.

Senator **Proxmire**. And on that kind of research you and Dr. Garwin differ a little on the cost, I think you agreed to go up $2 billion, Dr. Garwin would keep it at $1.4 billion which is the present level.

At any rate, you both agree that research of some kind to some extent is in conformance with the treaty and in our national interest?

Ambassador **Smith**. Yes, sir.

Senator **Proxmire**. But it should be in conformance with the treaty?

Ambassador **Smith**. That is correct. I think the figure I chose to support was the one in S. 879 which is $1.8 billion.

ADDITIONAL RESEARCH FOR SDI PROGRAM

Senator **Proxmire**. Dr. Garwin, you made a very, very startling statement that I think was lost because you gave us so much material that is useful. I want to ask you about it because it is startling.

You said if we go to $3.4 billion in this proposal, it would take 40,000 additional scientists and engineers; is that correct?

Mr. **Garwin**. That is right; $3.7 billion from the present $1.4, an increase of $2.3 billion next year, according to Donald Kerr would require 40,000 additional scientists and engineers.

Senator Proxmire. My question is: Where would they come from?

Mr. Garwin. They would come from programs they are working on right now. You don't convert people from working on automobiles—where we really ought to be working harder to be competitive—to working on laser systems.

Senator Proxmire. They would have to come from other defense programs?

Mr. Garwin. Almost entirely.

Senator Proxmire. I would think so because this is the area that would have relative competence.

Mr. Garwin. That is right. What happens is you don't create any more of them. You take them away from where they are. You run up the cost—or the price—of such people. You suffer the transition cost of putting them to work on something new and you don't need it.

This is not just a wasteful system, this is a dangerous system.

Senator Proxmire. Strictly from the standpoint of national defense, it seems to me that that is a mistake.

Mr. Garwin. Strictly from the standpoint of national security and even narrowly construed national defense, this is an error.

PROPOSED INCREASE IN SDI RESEARCH

Senate Proxmire. Dr. Drell, I believe that former Defense Secretary James Schlesinger has said that any research program on the strategic defense initiative should not be increased by more than 30 to 35 percent in a given year. That is about all of an increase such a program can wisely handle.

Do you agree with that assessment?

Mr. Drell. I do agree with that. I was there testifying with him before the Armed Services Committee. That is where my figure of up $2 billion came from.

Senator Proxmire. What sort of problems do you run into when you run up a program, research program like this too much?

Mr. Drell. You ask what can you do with that kind of money so quickly. Particularly in a high technology effort where there is so much to be learned, what you do and what we recommended against in our study is you start making demonstrations because that is where big money goes. Large-scale technology demonstration takes money.

It not only raises the treaty problems that Ambassador Smith was mentioning, but when you move quickly into a large technology demonstration before you prepare the research base, you tend to freeze less than optimal designs. You tend to have cost overruns. You tend to apply your high technical people in less than productive effort, the cost being that the basic broad R&D base suffers.

Senator Proxmire. Is it possible that such an enormous increase in 1 year could actually adversely affect the Strategic Defense Initiative research itself?

Mr. Drell. I believe yes. That was a specific conclusion of the workshop report that I mentioned.

Senator Proxmire. Mr. Smith, again as the most experienced, perhaps the most experienced negotiator we have in arms control, you along with Paul Nitze, in order for star wars to work, both supporters and critiques say the Soviets will have to display an unusual amount of cooperation.

First, they will have to reduce their offensive nuclear forces drastically. That was the original proposal.

Second, we will probably have to get them to eliminate any countermeasure they may want to employ.

Based on your negotiating experience with the Soviets, is there any possibility to get them to agree with these measures while we build a massive defense system?

Ambassador SMITH. I think there is not, Senator. I think in addition to those forms of cooperation we would have to persuade the Soviets to adopt the strategies, the defense strategies, we are talking about.

We have not had much luck in persuading the Soviets to change their strategy in the last 40 years. I think that this is a grand illusion that the Soviets are going to cooperate with us in helping us to make their missiles impotent and obsolete.

This is on a par with the offer tc give them this technology. I think it is a dream.

Senator PROXMIRE. Thank you very much.

My time is up.

I have a number of other questions, Mr. Chairman. This is an excellent panel. You have another panel coming up, so I will ask the panel be allowed to respond to them for the record.

Senator RUDMAN. That will be fine.

ANSWERS TO QUESTIONS SUBMITTED BY SENATOR ANDREWS

(1) I think that to contain the Soviet technology developments from becoming reality calls for a new commitment by both superpowers to the ABM Treaty which outlaws nationwide and space-based strategic defenses. In connection with any recommitment a number of moves to "tighten up" the Treaty would be in order. For example, to define the word component as used in the Treaty and to make more precise the cutoff between permitted research and ban development. There something should also be done to smother the building of large phased array radars.

(2) As for the question of support by European leaders for the SDI program, my surmise is that the European leaders don't like the program at all but are loath to say this in public. They don't like to be in opposition to the President of the United States. I think their reaction is based on a number of judgements:

(a) That the President's proposal for a total defense is simply non feasible.

(b) That an effort to move to defenses now will merely stimulate a new arms race.

(c) That regardless of American offers to share the research burden the Europeans, as has been the case in the past, will not actually be true partners.

(d) The additional cost of this adventure will make it harder, if not impossible, to fund necessary conventional force build-ups.

(e) A deep concern that "Star Wars" will trigger off a new wave of revulsion against strategic weaponry.

SDI DEFENSE AGAINST LOW-FLYING MISSILES

Senator RUDMAN. Senator Sasser.

Senator SASSER. Thank you, Mr. Chairman.

Gentlemen, thank you for this highly informative testimony. I am going to have sit down and reread some of these statements and I suspect reread some of them two or three times.

We are talking here about a Strategic Defense Initiative, so-called star wars, to intercept ICBM warheads. Let us just assume for a moment that we could build this Strategic Defense Initiative and could put it in place and it would work. It would be no defense, as I understand it, against low flying cruise missiles. It would be no defense against submarine-launched ballistic missiles. It would be no defense against bombers.

Is that a correct statement, gentlemen?

Ambassador **SMITH**. I think it would be effective against SLBM's.

Senator **SASSER**. Submarine-launched missiles?

Ambassador **SMITH**. Yes.

Senator **SASSER**. But not against cruise missiles?

Ambassador **SMITH**. Or bombers.

Senator **SASSER**. Mr. Smith, I will direct this question to the other panelists here.

In the event that the submarine-launched ballistic missiles the Soviets now use were moved to lower trajectories or low trajectory submarine-launched ballistic missiles, I take it that the star wars concept would not be effective against those; is that correct?

Ambassador **SMITH**. I think Sid ought to answer that.

Mr. **DRELL**. Certainly the star wars program before you is designed to handle threats that rise above the atmosphere and low depressed trajectories from submarines or cruise missiles from submarines would not by this system be countered at all.

In fact, it has been stated both by the administration and by opponents of this program that one of the implications of star wars would be yet another program because it would be kind of foolish if we were to make progress in eliminating the ballistic missile threat not to also begin to eliminate the threat from air-breathing missiles, the threat from cruise missiles and bombers.

There is yet another lien on talent and on dollars implied by this program.

Senator **SASSER**. So, if we move in the direction of trying to perfect a so-called star wars concept against high trajectory warheads or those that rise above the atmosphere, we would be pushing the Soviets then in the direction of developing low trajectory weapons that would come under this star wars defense.

Actually, we would not have gained anything at all unless we went forward then and tried to develop an additional defense against the low flying nuclear weapons. That is, the cruise missiles, the low trajectory submarine-launched ballistic missiles and the bombers.

Is that correct?

Mr. **GARWIN**. That is right. What you would be doing at best is imposing a cost on the Soviet Union. That is not the stated purpose of the SDI Research Program. It would be like barring the front door of the house while leaving three other doors open.

TWO-DEFENSE CONSTRUCTION

Senator **SASSER**. So, we would really be moving in the direction we would ultimately have to start construction on two defenses, one against the ICBM's and the atmospheric, the warheads that rise above the atmosphere, then we would have to come along and construct a defense against the submarine-launched ballistic missiles that operate on low trajectory and the bombers and the cruise missiles.

COST AGAINST BOMBERS AND CRUISE MISSILES

Do you have any idea what the cost of the defense would be against the cruise missiles and the bombers, et cetera?

Mr. **Garwin**. We have a data point. The Soviet Union unconstrained by any treaty has been building and operating air defense for many years against our B-52 bombers and now against our cruise missiles.

Our B-52 bombers will still make it to their targets in a nuclear war. So, this great technology, this vast expenditure of $10 billion a year has done nothing except somewhat increase the cost because we run in now at low altitude instead of high altitude.

Dr. Schlesinger has stated that will be another $50 billion a year, but I don't think that is a very good estimate. Certainly it is not included in the SDI Program for the research and nobody has priced out an effective air defense system, let alone a defense against all the other kinds of destructive attacks the Soviet Union could make.

Mr. **Drell**. It seems to me one of the very important points Dr. Garwin has just made is that the Soviet Union with more than 10,000 air defense missiles has not succeeded in blunting our bomber-cruise missile threat.

The offense has at lower expense and with simpler technology managed to stay ahead of defense there. That is an example of the problem.

USE OF DECOYS AGAINST SDI

Senator **Sasser**. So, let us assume that we were able to construct this star wars defense at the cost of some trillion dollars and got that in place by the year 2000. Then we come to the question of whether or not this star wars defense would be able to actually defend us against ICBM warheads coming in from the atmosphere.

We get to the question of overwhelming the star wars defense. Now, unclassified documents indicate that the Soviet Union could direct as many as 10,000 nuclear warheads toward the United States.

In addition, it has been estimated that the Soviet Union already has, and this comes from unclassified documents also, some 100,000 decoys which could be directed against the star wars system.

My question is this: If we could construct this system at great cost, would it not be possible for the Soviet Union to overwhelm the star wars defense system with more warheads than it could handle and also with so many decoys that it simply could not deal with this whole complex incoming cascade of decoys and warheads?

Mr. **Garwin**. By the year 2000 the Soviet Union could have 100,000 real warheads and 10 million decoys.

That is the crux of the matter whether these countermeasures are available in the same time period more cheaply than the defense.

It is my judgment that they will be. The SDI Program office says let us do the research for 10 years and then we will tell you. I believe that it is dangerous, wasteful. We have problems which we can solve now without waiting for 10 years and we can make that judgment now if we look at it with an open mind.

Mr. Drell. May I add one comment to that?

The idea of the SDI is to make a layered defense. The first one, to attack the missiles during boost phase. To address just this concern that you have raised that the Soviets even with their present missiles have so much throw-weight they can increase the number of warheads and have easily 100,000 or more decoys.

MISSILE INTERCEPT AT BOOST PHASE

One requires that the first layer or the boost phase intercept has effective so that when you destroy one missile, you get this whole collection of decoys and warheads. So, boost phase is crucial.

The SDI office has said that. I believe that is clear in the testimony. The boost phase is what brings us back to the question Dr. Garwin talked about in his testimony; namely, the hot-burn, high-thrust missile, because the boost phase, which is crucial, to address just your question, can be foreshortened to less than 1 minute.

Then you are talking about a totally automated game being fought within less than 1 minute, the burn being completed before the missile arrives at the top of the atmosphere and all those kinds of problems which make again the countermeasures for the offense look like they will be effective.

Senator Sasser. When you talk about this defense, about the fast-burn concept and getting the system less and less time, the defensive system less and less time to get itself into a posture to knock down the incoming warhead, you are moving this more and more from human control, are you not, and moving it more and more in the direction of being fully automated and controlled by computers and machines and you are removing the human element?

Mr. Drell. I think it is quite clear the only human element would be the first decision made within seconds to go. After that it will be a totally computerized system for a boost system.

TWO-DIRECTIONAL MOVE AGAINST SDI

Senator Sasser. If I were a Soviet planner and being confronted with the prospect in the future of a Strategic Defense Initiative, would it not be rational on the part of that Soviet planner to move in two directions at one time?

One, to construct more and more missiles with more and more warheads and more and more decoys to try to overcome the Strategic Defense Initiative, and then move in another direction to build more air-breathing or low trajectory nuclear weapons like cruise missiles or like aircraft that can carry the bombs, or the low trajectory submarine-launched missiles?

Would that be a rational way for a Soviet planner to move?

Mr. Drell. I would recommend it to the United States President where I could see the Soviet Union institute a clear expanded defense program headed toward a breakout in a defense against us.

Senator Sasser. So, if we continue down this path and if the Soviets react rationally as we would react, this is going to mean the construction of more and more nuclear warheads, more and more ICBM's, more and more warheads, and then more and more nuclear devices to be delivered at low altitude?

Mr. **Garwin**. In addition, there would be a greatly increased ASAT threat to our defense satellites. I think that is absolutely correct.

Senator **Sasser**. As we move down this path, we are spending enormous sums of money on technology that we have no assurance will work at all.

Mr. **Garwin**. Dr. Keyworth has said he would be pleased if the SDI and its resulting program resulted in a transition of the Soviet forces from the ICBM to the slow flying aircraft.

I would not be pleased to have the result of an expenditure of hundreds of billions of dollars be an unchanged nuclear threat which would take a few hours longer for the United States to be destroyed or coerced. That would not solve our problem.

NEED FOR CIVIL DEFENSE PROGRAM

Ambassador **Smith**. Mr. Sasser, may I make one observation along your line of questions?

There is another cost that is very seldom referred to. Not that you have to have antiair and anticruise, but also have to have a major civil defense program. If we are serious about defending the United States against ballistic missiles, we have to assume that it is not going to be pretty and there is going to be a substantial amount of destruction in the United States.

The only way that I can think of, if that happens, to protect yourselves is a major civil defense program. Now, it is very easy to have these big budgets for research and to let contracts. It is very hard to get the American people to agree to burrow underground, and that is what we are facing.

It is not just going to be a nice system way up in space. It is going to be Americans underground in blast, heat, and radiation shelters.

I think any Congress looking into this matter should press the administration hard on what their plans for civil defense are.

Mr. **Drell**. May I comment also on your line of questions and that is that it is just because of the issues you raise so correctly I believe that the vital first step for our national policy now is to construct an arms control framework because I think we can head off these problems you raise only if we have established a controlled framework, limiting offenses, limiting the countermeasures.

I think that will be a requisite before any defense program can hopefully lead us to a safer world.

Senator **Sasser**. Gentlemen, my time is up, I am advised.

I thank you for appearing here today.

Senator **Rudman**. I think before asking you to vacate those chairs—and I am sure you will be happy to—there are going to be a number of questions submitted to you by other members of this subcommittee who were not here this morning. Senator Byrd has a number of questions.

We will keep the hearing record open.

Let me ask one collective question to try to get a short answer from anybody.

FUNDING CONTINUATION OF SDI R&D

After hearing your testimony this morning, is it still your collective judgment that some amount of money, be it the 1.3 or 1.4 or 1.5, be spent continuing what has been going on with this program?

That, of course, would almost seem to be contradicted by some of the answers you gave to my friend from Tennessee at the very end of his questions to you. Let me see if I can put this clear in my own mind.

How much concern do you have with all the information that we think we have about the Soviet Union? The fact that we are a very open society, they are a closed society, and they are well known for their work in physics and applied engineering. How confident are you 10 years out, as a total surprise to the American scientific community, a total surprise to the American planning and security community, they come up with something that everyone in this country thought was years away, but in fact is a fait accompli, it is done, and we now have to start working on countermeasures of our own?

How much are you concerned with that? That is a major gamble when you have to make that kind of judgment. That is the kind of judgment the President has to make and the kind of judgment we have to make when we vote.

What is your judgment?

DEVELOPMENT OF COUNTERMEASURES

Mr. GARWIN. My fear of that is why I say work on countermeasures. SDI is not working adequately on countermeasures; they should have a Red Team which locks on countermeasures. Instead, each of the fans of technology works on that technology and gives the back of the hand to countermeasures.

We should also be working on countermeasures against Soviet possible defensive systems because there is no possibility on our side of protecting ourselves from the Soviet nuclear threat.

One has to eliminate the SDI Program, the SDI label, one should not eliminate a lot of the work that is being done.

Senator RUDMAN. Anybody else want to respond?

Mr. DRELL. Yes; I am concerned. That is why I think we must have a very strong technology base so that we can say with confidence we know what technology has to offer, we are not subject to technological surprise.

We have to have the technology base so that we can with confidence in our community say that there will be no such big surprises that can come full blown without extensive testing.

In our own recommendation we not only emphasize the importance of countermeasures, we also have to keep open the option to deploy limited defense that may be stabilizing in the event of Soviet breakout. That is why I disagree with SDI's total nonnuclear emphasis which is cutting out the capability of the only kind of defense we have any idea how to build right now; namely, the terminal traditional one with nuclear warheads.

Ambassador SMITH. As I said, Senator, one of the main reasons for having a vigorous research program is so we can understand our own intelligence about what is going on in the Soviet Union.

This goes to your question directly. We need this work in order to avoid any nasty surprises.

I would finally say the record is pretty good, though, over the last 40 years that we have been the leaders in every form of nuclear weapons or, as far as I know, delivery systems.

Senator RUDMAN. That is true.

Ambassador SMITH. With the presumption of continuance.

Senator RUDMAN. We also used to have a favorable balance of trade. We also used to be a creditor nation. We also used to have a balanced budget back in the dim past.

After all, the Japanese got a terrible surprise in August 1945. That came as a total shock to them, if you read their intelligence reports after the war on what they thought.

I expect that many people here are motivated by fear. I expect you are saying that is fine, but you are not sure we are going about it in the right way.

CORRESPONDENCE

Mr. GARWIN. I am sure we are going about it in the wrong way.

Could I submit for the record the February 20, 1985 letter which handles the question of the history of the satellites?

Senator RUDMAN. Fine.

[The letter follows:]

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February 20, 1985

Mr. John Bosma
Editor
Military Space
Pasha Publications Inc.
1401 Wilson Blvd., Suite 910
Arlington, VA 22209

Dear Mr. Bosma:

***** I hope that you will publish this article in full, as we discussed, in your Military SPACE of 05/04/85.*****

Readers of your February 4, 1985 article "SDI critic retreats from UCS case Los Alamos challenges Garwin's SDI numbers," have been misled by the self-serving statements of the "relieved SDI senior staffer," the "other specialists... who asked not to be identified," and the attribution to me of "agreement" or "convergence" with Dr. Canavan of Los Alamos.

It is as if after a stroll, they declare it a contest, write the rules, misstate the play, and declare they have won. Let's see.

First, I was not the "organizer" or "leader" of the study which led to the Union of Concerned Scientists (UCS) report of March 1984. Professors of Physics Henry Kendall of MIT and Kurt Gottfried of Cornell were co-chairs.

It is incorrect to "Remember, the Soviet 'reference force' and its deployment mode had been accepted all along by UCS, OTA, SDIO, DOE, and DOD participants as a common baseline with the whole thrust of the UCS/Garwin case being constellation sizes." Indeed that was NOT our case. Observe,

> "...readers who are not interested in such technical discussion can, without loss of continuity, skip these sections and proceed directly to the final section on countermeasures. Indeed, in our view it is much more important to understand the countermeasures because their efficacy and and political implications do not depend on the detailed properties of the various defensive systems under discussion. Furthermore, the countermeasures rely on existing technologies and quite simple aspects of orbital motions, and are therefore easier to understand than the proposed BMD systems themselves." (Page 23 of March 1984 UCS red book).

The heart of our technical case is countermeasures, not constellation size.

Nor did we ever price a satellite or constellation-- but SDI supporters have done so (e.g., Robert Jastrow in testimony of 08/09/84 to the House Republican Study Committee writes "Every laser-equipped satellite will cost about as much as a Trident submarine-- several billion dollars.")

Canavan misrepresents the public record, and imagines statements that were never made. Responding to one of his absurdities provokes an exponentially growing cloud of paper, and not responding is misrepresented as agreement. Your article asserts "'You and I have converged on all the basic calculations', Canavan told Garwin who did not respond." The tape recording of the session does have me responding with

> "Let me just respond. I agree that there is no distinction (only) in this regard-- that the exchange of letters has eliminated a lot of confusion and ignorance (tone of voice indicates meaning is "on the part of Dr. Canavan"). The question here is what the Soviets will have when we have the systems,...

The "debate before a neutral referee from Cornell University" did indeed occur 11/29/84 on the sole point of my assertion that Canavan used an incorrect procedure in a Los Alamos paper of 08/06/85 to determine the effectiveness of a boost-phase intercept satellite against a set of missiles distributed uniformly over the satellite's "circle of responsibility." To this day, Dr. Canavan persists in his error. The referee reports as follows (on 02/12/85):

> "For the case discussed, a single satellite attacking boosters distributed over a circular area, I believe it is correct to add required kill times for boosters, rather than to area-average kill rates, to evaluate the satellite capability."

which is precisely the point I have been making for months.

Now for the history of satellite numbers. The UCS document published March 1984, to which I was a contributor, assumed a 25 MW, 10-meter diameter laser, which at 3000 km has a kill time of 7 seconds against a booster of hardness 20 kilojoules per square centimeter, so that in an assumed 100-sec engagement, a satellite could kill 14 boosters. At my testimony to the Senate Armed Services Committee hearing of 04/24/85, (and in an Errata sheet to the UCS document distributed at the same time), I reduced the absentee ratio from 24 to 7 by assuming the satellites were placed in orbits which concentrate coverage at the latitude of Soviet silos-- an improvement factor of 3.4 (more recent studies by George Field indicate an improvement factor of only 2.8). In June we recognized that boosters at closer range could be killed in less than 7 seconds, so that Scientific American article and "The Fallacy of Star Wars" (a Vintage book) both published October 1984 quote 300 satellites-- a pretty accurate estimate for the assumed hardness and other highly idealized assumptions.

Canavan's calculations of May 4, 1984 and August 6 (two weeks and three months respectively after my congressional testimony) are incorrect. His papers convert satellite local requirements to overall satellite numbers by multiplying by the area of the earth ("global coverage"), the same factor 3 error we corrected in April 1984.

My own interest in SDI is to make the US as secure as possible. Experience shows that this is achieved by open analysis and by admitting error, if error there be. We have freely volunteered that our March 1984 satellite numbers were too high for ICBM intercept by two separate factors of 3. Canavan has never admitted that his May and August papers were similarly too high by one of those factors of 3, and that his August paper made an error in the opposite direction, also by a factor about 3, because of the addition of kill rate against different boosters rather than by the addition of kill time for a single satellite against various boosters. Every calculation in physics or engineering is approximate, but some are even wrong by their own assumptions. Canavan's satellite numbers are an example of the latter.

As we understand more about the problems and opportunities of satellite defense, our analyses get better and we can be more realistic-- hence the inclusion of retarget time in my paper of 12/28/84. Note that 3000 single-warhead boosters (no bus), clustered in a region larger than the state of Ohio and burning out in 40 seconds, would require 2263 perfect satellites in optimum orbits if the satellites could retarget in 3 seconds; 1488 for 0.5-sec retarget time, and 1110 for 0.1-sec retarget time-- the goal of SDI according to a letter of 01/13/85 from Major Worden to George Field. Interestingly enough, the calculation for distributed launch (1400 or 3000 boosters at 40-sec burn time spread over 10 million square kilometers) requires for 0.5-sec retarget time 357 or 723 satellites respectively-- 357 versus 765 would be a linear scaling, while 357 versus 523 would be Canavan's square-root scaling. Clearly square-root scaling is a bad approximation here. According to this calculation, 1400 distributed boosters could be handled by 162 satellites at 0.5-sec retarget time. For a constellation to handle 3000 distributed boosters at 0.5-sec retarget time, the analysis gives 311 satellites. Linear scaling from 162 satellites would give 347 and square-root scaling 237. Linear is much closer. So where is the claimed "square-root sizing" of my constellations?

I did not say my "newly introduced slew rates of 0.5 and 3 seconds are based technically, in the latter case, on NASA's monolithic-glass space telescope design... " I contrasted this 3-second assumption with "the space telescope has a settling time of 3 seconds for the smallest motion within a beamwidth, and several minutes for moving to a new target."

As for the feasibility of fast-burn boosters, Fletcher committee member General John Toomay (USAF retired), writes 06/22/84,

> "The attached document, Department of Defense Comments on Directed Energy Missile Defense in Space, May 8, 1984, is not a competent document. It contains falsehoods, irrelevancies, and misinterpretations... "

In regard to fast-burn boosters, this expert says

> "Since the technology for fast-burn boosters is acknowledged (the MX is a moderately fast-burn booster as Ashton Carter points out), the pace at which the Soviets would develop and deploy such a system is more or less in their hands. Since they and we have developed and deployed major missile systems in from six to ten years (depending on the perceived urgency), the 20-year estimate seems at least a factor of 2 out of line. The statements about fast-burn boosters having less payload, less RVs, less accuracy and less capability to countermeasure following phases imply the authors are confused between fast-burn boosters and hardened boosters. Fast-burn booster payload and countermeasure capability penalties should be slight (stiffening for the higher accelerations and dynamic pressures in the atmosphere)."

He goes on to say that

> "... to say that 'forcing the Soviets to go to fast-burn boosters is the same as deploying a highly effective boost-phase system' is making an absurdity out of a respectable analytic technique."

This from a man who has spent much of his life in the strategic technology area, both in the contemplation of ballistic missile defenses and in the management of the countermeasures (penetration aids) to those defenses. In reality, a fast-burn booster would use mature technology demonstrated since 1965 in flight tests of the SPRINT interceptor, which formed part of the SAFEGUARD ABM system the U.S. deployed in the 1970s, and by the Soviet Galosh interceptor, deployed for decades near Moscow. SPRINT achieved more than 50% of ICBM speed in a few-second burn, and the Soviet Union has since demonstrated a comparable interceptor. Since the Soviet Union has often built large rockets out of clustered rocket motors, it would be no great feat for the Soviets to build a fleet of fast-burn boosters, at a cost little in excess of that for a minimum-cost missile. More cheaply still, the Soviets could stay with their current ICBM force and deploy a small specialized fleet of Galosh-type interceptors to punch a large hole through any near-term space-based low-orbit BMD system.

Sincerely yours,

Richard L. Garwin

Also Adjunct Professor of Physics at Columbia University
(Views not necessarily those of IBM or Columbia)

SUBMITTED MATERIAL FOR RECORD

Senator Rudman. Your testimony has been very helpful and most instructive. We thank you very much.

We will keep the record open for additional material which you may wish to submit.

[The submitted material follows:]

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May 28, 1985

The Honorable Ted Stevens, Chairman
Senate Committee on Appropriations
Subcommittee on Defense
147 Senate Russell Office Building
Constitution Avenue
between Delaware Ave.
and 1st St., NE
Washington, DC 20510

Dear Senator Stevens:

As the hearing of April 22 was arranged in two successive panels, Dr. Jastrow had an opportunity to comment on my prepared Testimony and on my oral response to questions. I had no such opportunity and wish here to correct several misstatements in Dr. Jastrow's presentation, which I take from the transcript, but which are also confirmed by my notes. This, then, is my response for the record:

On Page 74 of the transcript, Dr. Jastrow estimates a cost of a Soviet fast-burn booster as "$100 million per warhead, perhaps $200 million." Here is a very interesting example of Dr. Jastrow's mode of estimation. In my various writings and testimony, I have indicated that the procurement and 10-year operating cost of a fleet of 1000 single-warhead Midgetman missiles, deployed in ordinary silos, could be $10 billion. Therefore, I have quoted a figure like $30 B for a fleet of 3000 single-warhead fast-burn Midgetman. Note that these do not have to be deployed in costly multiple-protective shelter systems, on mobile transporters, or the like, since, of course, the Soviet Union need not fear a U.S. first strike. Therefore, the instant-response $70-B cost volunteered by the Air Force in response to the Scowcroft Commission Report of April 1983 is inapplicable to a Soviet system, since it deals with very preliminary cost estimates for a U.S. mobile system. Let's see how Dr. Jastrow figures. First he asks Dr. James C. Fletcher's estimate of the increased cost of a warhead delivered by Midgetman compared with the MX. "Two times was a fairly solid figure in his view." What does Dr. Jastrow suggest to the Committee?: "So, 2 to 10 times might be a range."

And then Dr. Jastrow interjects "an interesting number, 1000 Midgetmen take 50,000 servicemen to maintain. It is a big operation and it transcends the cost of the initial hardware procurement." Again, this is a number for a totally mobile force-- not one deployed in silos as I have always suggested that the Soviets would do. For this, the

Also Adjunct Professor of Physics at Columbia University
(Views not necessarily those of IBM or Columbia)

operating cost would surely be less than that for 1100 much bigger *Minuteman* missiles deployed in 15,500 shelters, for which we see from the "MX Missile Basing Report"(September 1981) Page 102, an "O & S Cost" (Operating and Support) of $9.5 billion for about 10 years. Certainly, $1 B per year does not transcend the cost of the initial hardware procurement.

I quoted in my Testimony from the 06/22/84 letter of Major General John C. Toomay (a Deputy Chairman of the Fletcher Committee) to the effect that a "15 or 20 year" deployment time for a Soviet fast-burn booster overstates the case by at least a factor 2. The "$60 B dollars" in Dr. Jastrow's testimony is *not* the number for a 1000-Midgetman silo-based force. And Dr. Fletcher's "factor of 2" cost increase for a fast-burn booster is no more soundly justified than is his "15 or 20 years" as quoted by Dr. Jastrow. As for cost, there is a considerably greater assurance attached to *relative* estimates of cost than to the cost of a system itself. We may refer to the McDonnell Douglas contractor input to the Fletcher Committee of 07/29/83. In this document, there is a discussion of the relative costs of the "optimum" Midgetman, and the Midgetman which was specialized for fast-burn, burning out at 50 miles (80-km) altitude. In fact, the fast-burn Midgetman is their No. 16, and the optimum Midgetman (point-of-view of minimum weight and cost) is No. 1B on the enclosed two-page McDonnell-Douglas document of 07/29/83.

(The document follows:)

DIST/IDA
Suite 1400
1500 Wilson Blvd.
Arlington, VA 22209
Attn: J. W. Somers

Dear Jim,

The enclosed sketches and the following discussion of costs should complete all the action items for which we owe you responses. Please let me know if there are any other inputs which you need.

Costs of Small Missiles

The cost estimates which were sent to you earlier this week included a 20% allowance for a transporter. We now have estimated costs. The 20% allowance was amazingly close for the liquid missiles but was a little low for the solids. A comparison is shown below but I suspect the changes will not affect any conclusions you may have drawn from the previous estimates.

[illegible] + [illegible]
+10-22 [illegible]

Design	Previous Estimate Using 20% Factor ($ x 10^9)	Estimate($ x 10^9)	
1A	13.6	14.1	
2	15.5	15.7	
3	16.1	16.3	
4	18.6	18.6	
5	19.5	19.4	
1B	8.7	9.8	← "[illegible]"
14	9.2	10.5	
15	9.6	10.9	
16	10.4	11.1	— 30 km
17	13.1	14.1	

Costs of MIRV'ed vs. Small Missiles

The guidance system cost over half of the total cost of a small missile according to a BMO study done in 1981. Therefore it appears clear to our designers and program managers that MIRV'ing missiles will save money on the basis of missile cost per RV or per pound of throw weight. It appears that using 3 RVs per missile could save about one-third of the cost of 3 RVs each on separate missiles, and that going to 10 RVs per missile could increase the saving to about one-half.

Cost per RV, however, is usually not considered as a good figure of merit for our ICBM systems. A better measure is the cost per surviving RV after a first strike. In that case, there are significant additional costs related to the basing mode which may completely outweigh the cost advantage which MIRV'ing would otherwise offer. We have not been able to find a comparison of costs of single and MIRV'ed missiles which appears to be based on consistent assumptions of both the required number of surviving RVs and the costing methodology. Comparing costs that we have seen for MX vs. Small ICBM (which may be comparing apples and oranges) would suggest that the cost per surviving RV is roughly comparable.

"Roughly comparable in cost" may not, of course, be an entirely satisfying statement when discussing systems which cost tens of billions of dollars, since even a 10% difference amounts to a significant amount of money. Nevertheless, it is the best that we can do at this time.

I hope that this discussion is of some use to you. I will be in my office most of the week of the 1 August week, so give me a call if you think of anything else you need.

E A Fitzgerald

E. A. Fitzgerald
Nuclear Vulnerability & Hardening
Strength Analysis
Design & Technology
Engineering Division

MCDONNELL DOUGLAS
CORPORATION

Although the two-stage solid missile No. 1B burns out at 338 km, and the fast-burn Midgetman No. 16 burns out at 80 km, the optimum missile weighs 19,100 kg, and the fast-burn Midgetman weighs some 24,100 kg. This increase of about 25% is reflected in a comparable increase in cost of the missile itself, but not of the maintenance or basing system.

Of note is the 07/29/83 cost estimate for the entire system (research, development, test and evaluation, investment and 10 years of spares, at a cost of $9.8 B for the optimum Midgetman and $11.1 B for the fast-burn Midgetman. For silo-based ICBMs, the manpower cost is negligible. I suggest that these contractor's written estimates, the results of the "General Missile Sizing Program" are far closer to the mark than Dr. Jastrow's calculations. Dr. Jastrow is right that this number of $11 million per warhead cannot be squared with his numbers of $200 million per warhead, and the reason is that he has taken over the cost from a very expensive mobile system, and increased the overall system cost by at least a factor 2 in going to a fast-burn booster, instead of doing things the way the Soviet Union would (and we could, if our need was to counter defenses).

My interest in the Midgetman antedates a one-day visit to Boeing, Seattle, January 5, 1983 which I described in the enclosed excerpts from a letter of 01/06/83. I provided this material to the Scowcroft Commission in my oral Testimony of 01/27/83, two months before the President's Star Wars speech:

> "The Boeing program is called "AICBM (for Advanced ICBM) because small ICBM (or small, single-warhead ICBM) is too specific for the Air Force technology sponsors. Naturally, considering Air Force priorities, the AICBM program is a post-1990 effort, in anticipation of MX being the current production program. Furthermore, the AICBM work is sponsored by that segment of the Air Force interested in advancing technology, so it is, by definition, addressing unsolved problems.
>
> The propulsion folk, for instance, answer that there are no unsolved problems in providing propulsion for a SICM-- the fuel and nozzle technology for the MX can be applied directly to the SICM, going to a flight test in 12-15 months...
>
> Computer trades (with the MX as a benchmark for realism) show (naturally) that if one defines the payload as 850 lbs, including the Mk-21 RV, a guidance system, a shroud, and a PBV, then the missile can be built with either two or three stages and would weigh about 23,000 lbs for a 6000-mi range. With a 2-stage missile, it is easier to get the transverse stiffness and strength desirable for minimizing the cost of silo or mobile basing. One can buy, off the shelf, the Singer Mk-5 guidance system, at 85 lb and $500 K. The Mk-21 RV is that specified for the MX.
>
> One gets the strong impression that the cost of the missile would essentially be cost per pound and that (aside from the guidance system), SICM missile cost would thus be about 20% more per warhead than the MX. Of course, the acquisition cost of the 100 missiles for Dense Pack would be $2 billion out of a total 10-year system cost of $26 billion, so that an increase of 20% in that component is irrelevant in an overall system choice.
>
> If one uses silo-basing of a SICM, the silos will be cheap, most of the launch-support equipment having been moved to the capsule of the missile. In one analysis, the missile at 24,000 lb gross weight would be enclosed in a canister weighing 9000 lbs, making a single roadable truck weighing in overall below 85,000 lbs,

> including 17,000 lbs for the "safeguard container." A silo-deployed SICM could not possibly have silos hard enough to survive attack by highly accurate RVs. Thus, 2000 psi would be hard enough to force use of a first-class system, making a relatively inexpensive basing system. One would have to provide intrusion alarms, and the like, but these could be done with current technology at very low power, with the radio transmission of problems (and occasional all-OK encrypted signal) supported by batteries.
>
> Some interesting aspects of guidance include the fact that an adjunct for use with the global positioning or ground beacon systems (GPS or GBS) now weighs 10 lbs."

On Page 75 of the transcript, Dr. Jastrow questions the "40,000 scientists and engineers" that I quoted from a speech at Ohio Wesleyan University by Dr. Donald Kerr as the number which would be consumed by the proposed increase of the SDI budget from $1.4 to $3.7 B this next year. (I called Dr. Kerr 05/21/85 to verify that I was not misquoting him. He indicated that he may have said "could", rather than "would," and that he could not, of course, stand by such a particular number without knowing how the program was to be conducted.)

On Page 75 of the transcript, Dr. Jastrow argues that our B-52s cannot now penetrate Soviet air defenses. The Defense Department Report "Soviet Military Power" on Page 48, does not seem to agree with Dr. Jastrow. It is my understanding that continued modification to the electronic warfare suite on the B-52 enable them to penetrate as necessary in nuclear war, but the Committee should check with the Air Force-- it could save billions of dollars by mothballing the B-52s if it is true that they can no longer penetrate.

On Page 78, Dr. Jastrow states that the very same system which can handle the ballistic missile threat can handle cruise missiles.

> -- many Defense witnesses including LGen. Abrahamson have testified to the contrary:
>
> -- Dr. Ed Gerry, President of W.J. Schaefer Associates in a televised public meeting 05/24/85 at Dartmouth College spoke approvingly of SDI weapons which could in no way damage anything on earth-- lasers whose beams would be absorbed by the lower atmosphere. These, of course, could not touch cruise missiles even if cruise missiles could be seen.

On Page 80 of the transcript, Dr. Jastrow requires our defense "Only to be good enough to guarantee survival of our nuclear retaliatory forces"-- enough to "strike back with the bulk of our nuclear weapons and reduce all major Soviet cities to rubble in 30 minutes"-- his words. But we already have such a defense-- none at all, because of the basing of most of our retaliatory warheads on aircraft and submarines. And if a survivable deterrent is what Dr. Jastrow is aiming for, he should support my urging development of a low-cost single-warhead Midgetman missile-- to be deployed as needed in modest silos at a cost of $10 M per missile. Since no more than one warhead could be destroyed by a Soviet warhead, we could easily maintain even an adequate land-based deterrent against 20,000-30,000 Soviet strategic warheads with something like half that many Midgetman-- if necessary with the multiple aimpoint system of cheap vertical silos proposed for Minuteman by William van Cleave and Paul H. Nitze-- although this works even better with Midgetman. No SDI is necessary for this purpose.

On Page 81 of the transcript, Dr. Jastrow indicates the $60 billion system he described 01/27/85 with Dr. Brzezinski and Ambassador Kampelman would be at least 90% effective. But that system when it could be deployed would be totally vulnerable to the Soviet nuclear-armed BMD interceptor-- Galosh-- deployed around Moscow for the last 15 years. It could suddenly blow a hole in the satellite system big enough to eliminate its boost-phase intercept capability, and the rocket-bearing satellites could do nothing about it, as indicated in the enclosed two publications in the New York Times.

(The New York Times articles follow:)

THE NEW YORK TIMES, THURSDAY, MARCH 7, 1985

Shrouded Galoshes Beat 'Space Trucks'

To the Editor:

Robert Jastrow, in "Why Our Star Wars Beats Their Galoshes" (letter, Feb. 23), asserts that our Op-Ed article of Feb. 12 describes a fatally flawed scheme for nullifying a near-term space defense proposed by Mr. Jastrow in an article written with Zbigniew Brzezinski and Max Kampelman. That is not so. Mr. Jastrow appears not to know how in space launches we routinely protect the payload from heating or disturbance by the atmosphere.

We pointed out that some 10 to 20 Soviet Galoshlike interceptors, with their large nuclear warheads, could punch a big hole in the fleet of orbiting "space trucks" posited by Mr. Jastrow et al., a hole through which Soviet ICBM's could then be launched as if there were no space defense.

In his letter, Mr. Jastrow says that his space trucks could track the Galosh even after its booster engine burned out because air friction would have made it glowing hot. According to Mr. Jastrow, the heat-seeking homing projectiles launched by his space truck could therefore destroy the Galosh.

But like every delicate satellite and every multiple-warhead ICBM, the Galosh warhead would be protected by a shroud against wind and heat. The shroud would be discarded above the atmosphere just as one removes a mitten aflame on its outside. As we said, by the time any of Mr. Jastrow's homing projectiles could reach it, the Galosh would be too cool to be found, and to boot, indistinguishable from decoys it could eject.

Our point is that all the "Star Wars" schemes envisioned can be defeated by relatively inexpensive countermeasures — in this case a shroud. The Galosh demonstrates one way that an orbiting battle station is vulnerable, whether it houses lasers, particle beams or Mr. Jastrow's homing projectiles.

RICHARD L. GARWIN
KURT GOTTFRIED
Yorktown Heights, N.Y., Feb. 26, 1985

THE NEW YORK TIMES, TUESDAY, FEBRUARY 12, 1985

Pie in the Sky — or Space Defense?

Even Half Way Is Wrong

By Richard L. Garwin and Kurt Gottfried

ITHACA, N.Y. — Advocates of an interim missile-defense system say it could be in orbit in the early 1990's at a cost that is not mind-boggling. What they don't say is that it would be a house of cards. The foundations of the proposal are the same misconceptions that underlie the entire "Star Wars" initiative.

No one suggests that the interim approach could render nuclear weapons impotent or obsolete. But its proponents say that deployment of the system would not only constitute a large first step in the Strategic Defense Initiative — a step toward defending our population — but also would compel the Soviet Union to abandon its penchant for land-based intercontinental ballistic missiles. This, the proponents say, would lay to rest their fears of a Soviet first strike. They are wrong.

The Russians could easily demolish the interim defense, which would consist of two separate "shields," with a weapon that has long been in their arsenal. Our first "shield" — low-orbiting satellites known as "space trucks" — would carry heat-seeking rockets to intercept Soviet missiles shortly after liftoff, while their booster engines were still brightly burning. The second "shield," ground-based rockets, would intercept incoming warheads.

The Russians, using their so-called Galosh missiles, which have been deployed since the 1960's, could eliminate the space trucks at will. After the Galosh missiles' fast-burn boosters stopped firing well within the atmosphere in a half minute or less, ground-based radar need only guide those missiles toward our satellites. Detonation of the large nuclear warhead would demolish any satellite within five miles without disrupting the Soviet military communications system.

Our space trucks could not defend themselves. Their rockets could not reach a Galosh during the short time its plume was burning; thereafter, the Galosh would be far harder to find. To further protect itself, the Galosh could eject decoys to distract our homing rockets.

Here is a scenario of a Soviet attack. First, a salvo of Galosh missiles would punch, in our "shield," a hole through which Soviet ICBM's would be delivered with as much or as little impunity as today. Our second "shield" would be useless, for the incoming ICBM's would release a swarm of decoys within which the warheads would be like needles in a haystack. Our ground-based rockets would have to wait for the swarm to enter the atmosphere, where drag would strip away the light decoys and reveal the warheads. By then, it would be too late to protect our cities.

Thus, the Galosh demonstrates that a relatively crude nuclear weapon can negate a sophisticated defense and that the Russians could frustrate any orbiting defense without replacing, or even retrofitting, their ICBM's.

While the proposed interim defense has no military value, the concept would enhance our security if it drove home the lesson that only hardened, expendable targets such as missile silos can be defended against a large-scale nuclear attack.

The interim-defense proposal offers a cure for a disease that does not exist, for President Reagan's Scowcroft Commission has explained that our Minuteman ICBM's, as part of the overall strategic deterrent, are not vulnerable to a first strike.

Thus the interim approach is nothing but a placebo. Its pursuit would destroy the Anti-Ballistic Missile Treaty and thereby greatly amplify the pace and multiply the hazards of the strategic competition.

If we abandoned Star Wars, the Galosh missile would not preclude valuable negotiated constraints on Soviet anti-satellite weapons. The goal of anti-satellite arms control, together with the ABM treaty, is to prevent proliferation of non-nuclear anti-satellite weapons, because their use in a low-level conflict could trigger escalation to nuclear war. Anti-satellite arms control itself cannot alter the superpowers' ability to fight a large-scale nuclear war, but it can put an obstacle in the likely path toward such a catastrophe. □

Richard L. Garwin, an I.B.M. physicist, has been a Pentagon consultant for more than 30 years and has served on the Presidential Scientific Advisory Committee. Kurt Gottfried, professor of physics and nuclear studies at Cornell University, is a director of the Union of Concerned Scientists.

Dr. Jastrow goes far beyond his knowledge (Page 85 of the transcript) in stating "It is true that only a handful of physicists with full clearances for SDI-- I know only four hold this view, whereas Drs. Fletcher and Keyworth, General Abrahamson and his staff, and hundreds-- more likely thousands-- of highly competent scientists and engineers at Livermore, Los Alamos, and other defense laboratories, all believe the SDI program is sound." When you see the virulence of the attacks on at least three of these four scientists-- Drs. Bethe, Drell, and myself, you can understand how those whose livelihood comes from their contributions to these programs or to these laboratories would be foolhardy in expressing a critical judgment publicly. But such people exist-- Ray Kidder and Hugh DeWitt at Livermore for instance-- and many others. Several of the signatories to the Stanford Workshop Report have "full clearances" and must be added to Dr. Jastrow's list, I suppose.

Dr. Jastrow sadly concludes that "it may be difficult for a person who spends only a part of his time in these complex matters-- taking time off from teaching, research, and administration-- to do as sound a job on the technical analysis as the individuals who are spending full time on the problem, have full computational support, and are backed by hundreds, or thousands, of colleagues." T'was ever thus, one would imagine, yet my colleagues elected me in 1978 to the US National Academy of Engineering with the citation "Contributions applying the latest scientific discoveries to innovative practical engineering applications contributing to national security and economic growth." And as regards specifics, on May 24, 1985 at Dartmouth College, Dr. Ed Gerry and I presented a series of agreed propositions of which I cite all 15:

1. No system has been publicly presented which satisfies the twin requirements of the administration as presented by Paul Nitze 02/20/85-- to be survivable, and to be cost effective. (AGREED).
2. No viable defensive system can allow space mines to be placed within lethal range of space assets. (AGREED).
3. The utility of pop-up for boost phase intercept can be negated by fast-burn boosters. (AGREED).
4. If rail guns are to be used for ballistic missile defense, they must propel homing kill vehicles. (AGREED).
5. The energy efficiency considerations favor chemically propelled homing kill vehicles over rail guns up to an added velocity implied by the following equation: under assumptions of an electrical generation efficiency of 30%, rail gun efficiency of 30%, chemical rocket specific impulse of 300 seconds and stage-mass fraction of 90%. This velocity is approximately 16km/sec. (see following table and calculations) (AGREED).
6. Close-spaced decoys multiply greatly the number of HKVs needed for mid-course intercept unless they can be discriminated and designated. (AGREED).
7. Space-based kinetic energy weapons are fundamentally limited in effective range by their velocity and the time available for flyout to the target after launch. (AGREED but trivial).
8. In the context of an effective surveillance, acquisition, tracking, and designating system, HKVs would be effective in boost phase against the current class and deployment of Soviet ICBMs and SLBMs, and would have continuing effectiveness against re-entry vehicles in mid-course, and in defense of space-based assets, providing the space-based systems can survive, and Soviet countermeasures aren't effective. (Gerry believes that the system can survive and be effective against countermeasures, Garwin dissents).
9. In the continuing context of deterrence of nuclear war by threat of retaliation, technologies already exist to solve the problem of strategic force vulnerability sooner and at lower cost than via layered defense with space components. (AGREED).

10. Within the context of continuing deterrence of nuclear war by threat of retaliation, existing technology involving nuclear intercepts in space could be employed to handle a few rogue-nation ICBMs. A cooperative system could handle accidental launch of one or a few Soviet ICBMs. (AGREED).
11. Equation 13 of "How Many Orbiting Lasers for Boost Phase Intercept?" (Garwin) provides a good estimate of the number of laser battlestations of a given brightness and retarget time to counter a prescribed threat. The following table provides results of this calculation for various assumptions. (AGREED).
12. There is no known fundamental limit to laser power or brightness that can be achieved other than cost. (AGREED).
13. Countermeasures are a fundamental problem to the success of a high-performance strategic defense. (AGREED).
14. The SDI program is exploring possible solutions to all of the countermeasure issues which have been raised publicly and more. (AGREED).
15. So long as the Soviets can reliably deliver by any means (e.g., aircraft, cruise missiles, suitcase bombs) numbers of nuclear weapons causing catastrophic national damage, capability for nuclear retaliation against the Soviets will still be required for deterrence. (AGREED). Garwin's comment: The President's SDI-speech goal of eliminating offensive nuclear weapons will not then have been achieved.

Statements 2, 3, 9, 11, and 13 are particularly relevant to Dr Jastrow's point-- Statement 11 referring to the equation from which the graph on Page 10 of my Testimony and the last column of the Table on Page 12 were calculated. It would indeed be helpful if the full-time workers in the SDI program would publish their results as I have done in my Nature article of 05/23/85. I will forward a copy to you in the next few days.

It would be very valuable if the SDI Program Office would open an unclassified reading room as I requested of LGen. Abrahamson in the enclosed letter of 07/16/84.

(The letter Follows:)

Richard L. Garwin
IBM Thomas J. Watson Research Center
P.O. Box 218
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July 16, 1984

LGen James A. Abrahamson, USAF
Director,
Strategic Defense Initiative
The Pentagon
Room 3-E 1034
Washington, DC 20301

Dear Jim,

As you may know, the American Academy of Arts and Sciences is sponsoring the preparation of a book on space weapons. Hans Bethe and I are providing a chapter, as are John Toomay, Al Flax, and Gerald Yonas. Ash Carter has a chapter as well.

At a recent meeting to go over preliminary drafts, one of the participants noticed that technical and substantive references were primarily to Aviation Week, or very occasionally to Soviet publications, but that there were very few references to information provided by the Administration regarding the substance of the Strategic Defense Initiative-- status and goals of laser power, optics, and the like. Of course, we can now reference the OTA Background Paper.

Nevertheless, it would be extremely useful for the Strategic Defense Initiative to make available all of the technical information which can be provided in an unclassified fashion, so that those who wish to understand the SDI can have a better chance of doing so. This includes the authors as well as the readers of the American Academy book.

Perhaps as a first step one might create an SDI reading room, while an SDI contractor wrote an analogue to the Ash Carter paper. Will you help us with this effort?

Very best regards.

Sincerely yours,

Richard L. Garwin

RLG:rsa:198_JAA:071684.JAA

Also Adjunct Professor of Physics at Columbia University
(Views not necessarily those of IBM or Columbia)

This Committee would ensure more rapid progress, less likelihood of error, and better return on the dollar if it urged this as well.

Dr. Jastrow on Page 87 refers to "by now the well-known fact, the first estimate by UCS (the Union of Concerned Scientists) is 2400 of these satellites at a billion dollars apiece, that is $2.5 Trillion, which makes the President's proposal for defense a turkey." I have never estimated a cost of the laser-bearing satellite. We did estimate a cost of lift of the satellite fuel to space, using the shuttle; indeed, at about 10 tons per satellite and $5 M per ton into near-polar orbit, about 2400 satellites would cost about $120 billion for lift-- a small fraction compared with Dr. Jastrow's estimate of $2.5 Trillion. So that is his number-- not ours. Dr. Jastrow himself estimated each satellite would cost "several billion dollars" in his August 9, 1984 prepared testimony to the House Republican Study Committee. Since each such satellite according to Figure 1 of my Testimony (at 0.1 seconds retarget time as hoped for by the SDI Program Office) can handle only about three fast-burn boosters, his own characterization of the President's program presumably stands.

I promised the Chairman that I would supply for the record a history of these satellite numbers, and I now insert it-- in the form of a letter to Mr. John Bosma, editor of Military SPACE.

(The letter follows:)

Richard L. Garwin
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February 20, 1985

Mr. John Bosma
Editor
Military Space
Pasha Publications Inc.
1401 Wilson Blvd., Suite 910
Arlington, VA 22209

Dear Mr. Bosma:

***** I hope that you will publish this article in full, as we discussed, in your Military SPACE of 05/04/85.*****

Readers of your February 4, 1985 article "SDI critic retreats from UCS case
Los Alamos challenges Garwin's SDI numbers," have been misled by the self-serving statements of the "relieved SDI senior staffer," the "other specialists... who asked not to be identified," and the attribution to me of "agreement" or "convergence" with Dr. Canavan of Los Alamos.

It is as if after a stroll, they declare it a contest, write the rules, misstate the play, and declare they have won. Let's see.

First, I was not the "organizer" or "leader" of the study which led to the Union of Concerned Scientists (UCS) report of March 1984. Professors of Physics Henry Kendall of MIT and Kurt Gottfried of Cornell were co-chairs.

It is incorrect to "Remember, the Soviet 'reference force' and its deployment mode had been accepted all along by UCS, OTA, SDIO, DOE, and DOD participants as a common baseline with the whole thrust of the UCS/Garwin case being constellation sizes." Indeed that was NOT our case. Observe,

> "...readers who are not interested in such technical discussion can, without loss of continuity, skip these sections and proceed directly to the final section on countermeasures. Indeed, in our view it is much more important to understand the countermeasures because their efficacy and and political implications do not depend on the detailed properties of the various defensive systems under discussion. Furthermore, the countermeasures rely on existing technologies and quite simple aspects of orbital motions, and are therefore easier to understand than the proposed BMD systems themselves." (Page 23 of March 1984 UCS red book).

The heart of our technical case is countermeasures, not constellation size.

Nor did we ever price a satellite or constellation-- but SDI supporters have done so (e.g., Robert Jastrow in testimony of 08/09/84 to the House Republican Study Committee writes "Every laser-equipped satellite will cost about as much as a Trident submarine-- several billion dollars.")

Canavan misrepresents the public record, and imagines statements that were never made. Responding to one of his absurdities provokes an exponentially growing cloud of paper, and not responding is misrepresented as agreement. Your article asserts "'You and I have converged on all the basic calculations', Canavan told Garwin who did not respond." The tape recording of the session does have me responding with

> "Let me just respond. I agree that there is no distinction (only) in this regard-- that the exchange of letters has eliminated a lot of confusion and ignorance (tone of voice indicates meaning is "on the part of Dr. Canavan"). The question here is what the Soviets will have when we have the systems,...

The "debate before a neutral referee from Cornell University" did indeed occur 11/29/84 on the sole point of my assertion that Canavan used an incorrect procedure in a Los Alamos paper of 08/06/85 to determine the effectiveness of a boost-phase intercept satellite against a set of missiles distributed uniformly over the satellite's "circle of responsibility." To this day, Dr. Canavan persists in his error. The referee reports as follows (on 02/12/85):

> "For the case discussed, a single satellite attacking boosters distributed over a circular area, I believe it is correct to add required kill times for boosters, rather than to area-average kill rates, to evaluate the satellite capability."

which is precisely the point I have been making for months.

Now for the history of satellite numbers. The UCS document published March 1984, to which I was a contributor, assumed a 25 MW, 10-meter diameter laser, which at 3000 km has a kill time of 7 seconds against a booster of hardness 20 kilojoules per square centimeter, so that in an assumed 100-sec engagement, a satellite could kill 14 boosters. At my testimony to the Senate Armed Services Committee hearing of 04/24/85, (and in an Errata sheet to the UCS document distributed at the same time), I reduced the absentee ratio from 24 to 7 by assuming the satellites were placed in orbits which concentrate coverage at the latitude of Soviet silos-- an improvement factor of 3.4 (more recent studies by George Field indicate an improvement factor of only 2.8). In June we recognized that boosters at closer range could be killed in less than 7 seconds, so that Scientific American article and "The Fallacy of Star Wars" (a Vintage book) both published October 1984 quote 300 satellites-- a pretty accurate estimate for the assumed hardness and other highly idealized assumptions.

Canavan's calculations of May 4, 1984 and August 6 (two weeks and three months respectively after my congressional testimony) are incorrect. His papers convert satellite local requirements to overall satellite numbers by multiplying by the area of the earth ("global coverage"), the same factor 3 error we corrected in April 1984.

My own interest in SDI is to make the US as secure as possible. Experience shows that this is achieved by open analysis and by admitting error, if error there be. We have freely volunteered that our March 1984 satellite numbers were too high for ICBM intercept by two separate factors of 3. Canavan has never admitted that his May and August papers were similarly too high by one of those factors of 3, and that his August paper made an error in the opposite direction, also by a factor about 3, because of the addition of kill rate against different boosters rather than by the addition of kill time for a single satellite against various boosters. Every calculation in physics or engineering is approximate, but some are even wrong by their own assumptions. Canavan's satellite numbers are an example of the latter.

As we understand more about the problems and opportunities of satellite defense, our analyses get better and we can be more realistic-- hence the inclusion of retarget time in my paper of 12/28/84. Note that 3000 single-warhead boosters (no bus), clustered in a region larger than the state of Ohio and burning out in 40 seconds, would require 2263 perfect satellites in optimum orbits if the satellites could retarget in 3 seconds; 1488 for 0.5-sec retarget time, and 1110 for 0.1-sec retarget time-- the goal of SDI according to a letter of 01/13/85 from Major Worden to George Field. Interestingly enough, the calculation for distributed launch (1400 or 3000 boosters at 40-sec burn time spread over 10 million square kilometers) requires for 0.5-sec retarget time 357 or 723 satellites respectively-- 357 versus 765 would be a linear scaling, while 357 versus 523 would be Canavan's square-root scaling. Clearly square-root scaling is a bad approximation here. According to this calculation, 1400 distributed boosters could be handled by 162 satellites at 0.5-sec retarget time. For a constellation to handle 3000 distributed boosters at 0.5-sec retarget time, the analysis gives 311 satellites. Linear scaling from 162 satellites would give 347 and square-root scaling 237. Linear is much closer. So where is the claimed "square-root sizing" of my constellations?

I did not say my "newly introduced slew rates of 0.5 and 3 seconds are based technically, in the latter case, on NASA's monolithic-glass space telescope design... " I contrasted this 3-second assumption with "the space telescope has a settling time of 3 seconds for the smallest motion within a beamwidth, and several minutes for moving to a new target."

As for the feasibility of fast-burn boosters, Fletcher committee member General John Toomay (USAF retired), writes 06/22/84,

> "The attached document, Department of Defense Comments on Directed Energy Missile Defense in Space, May 8, 1984, is not a competent document. It contains falsehoods, irrelevancies, and misinterpretations... "

In regard to fast-burn boosters, this expert says

> "Since the technology for fast-burn boosters is acknowledged (the MX is a moderately fast-burn booster as Ashton Carter points out), the pace at which the Soviets would develop and deploy such a system is more or less in their hands. Since they and we have developed and deployed major missile systems in from six to ten years (depending on the perceived urgency), the 20-year estimate seems at least a factor of 2 out of line. The statements about fast-burn boosters having less payload, less RVs, less accuracy and less capability to countermeasure following phases imply the authors are confused between fast-burn boosters and hardened boosters. Fast-burn booster payload and countermeasure capability penalties should be slight (stiffening for the higher accelerations and dynamic pressures in the atmosphere)."

He goes on to say that

> "... to say that 'forcing the Soviets to go to fast-burn boosters is the same as deploying a highly effective boost-phase system' is making an absurdity out of a respectable analytic technique."

This from a man who has spent much of his life in the strategic technology area, both in the contemplation of ballistic missile defenses and in the management of the countermeasures (penetration aids) to those

AVAILABLE

defenses. In reality, a fast-burn booster would use *mature* technology demonstrated since 1965 in flight tests of the SPRINT interceptor, which formed part of the SAFEGUARD ABM system the U.S. deployed in the 1970s, and by the Soviet Galosh interceptor, deployed for decades near Moscow. SPRINT achieved more than 50% of ICBM speed in a few-second burn, and the Soviet Union has since demonstrated a comparable interceptor. Since the Soviet Union has often built large rockets out of clustered rocket motors, it would be no great feat for the Soviets to build a fleet of fast-burn boosters, at a cost little in excess of that for a minimum-cost missile. More cheaply still, the Soviets could stay with their current ICBM force and deploy a small specialized fleet of Galosh-type interceptors to punch a large hole through any near-term space-based low-orbit BMD system.

Sincerely yours,

Richard L. Garwin

RLG:rsa:043|JB:021285..JB

Dr. Jastrow received permission to put into the record a *Wall Street Journal* Letter-- I suppose by LGen. Abrahamson. I believe it would be useful if I provided both a recent *Wall Street Journal* editorial and my own comment.

(The editorials follow:)

WALL STREET JOURNAL--4/30/85

Letters to the Editor

Low Tricks on the High Frontier?

Your April 5 editorial "Real Whistle Blowers" is deceptive and just plain wrong. It extols Lt. Gen. Daniel O. Graham for his attempts to defeat a draft paper of the Congressional Office of Technology Assessment (OTA). It praises Dr. Gregory H. Canavan for doing battle with me over the number of laser satellites adequate for destroying a fleet of Soviet ICBMs. Readers should note, incidentally, that the Journal editorial staff includes Gregory A. Fossedal, co-author with Graham of the book "A Defense that Defends," an advocacy brief for the High Frontier space defense.

WSJ errs in stating that Graham and I served on an OTA panel "to write a report." The panel is advisory, only, to OTA—each of us alert to factual errors and ensuring that our point of view is fairly presented along with opposing views. Blocking the report or soliciting congressional pressure is inconsistent with the responsibility freely assumed by a panel member, civilian or military.

WSJ errs in fact and interpretation on the number of satellites. It relies on biased reports of meetings it did not attend. The "panel of top defense scientists" which met on Jan. 10 did not find, "for the real problem, the answer is 100 or less." It gave no opinion at all on this matter. The "independent referee from Cornell" did not opine on satellite numbers but, in a written statement of Feb. 12, found that my approach was correct and Canavan's incorrect.

WSJ errs to a point of irresponsibility in claiming that what I say or write in public is contradicted by my knowledge of secret exchanges or that it is not taken seriously by colleagues in the defense community. This statement in a panel discussion before the House Armed Services Committee March 1984 was formally rejected for the record by Prof. Norval Fortson of the University of Washington.

WSJ takes out of the air a satellite cost of "say $500 million." Another of its heroes, Dr. Robert Jastrow, in a written statement of Aug. 9 says, "Every laser equipped satellite will cost about as much as a Trident submarine—several billion dollars."

WSJ errs in giving credence to low satellite numbers (fewer than 100) obtained by assuming satellites in the year 1995 or 2000 or beyond faced with Soviet ICBMs in current numbers and locations. In exploring whether such defenses are "cost-effective at the margin," as required by Paul H. Nitze speaking for the government, we must look at how the Soviets could respond at less cost. One way is to increase the number of missiles, shorten their boost time at a cost estimated by government contractors as 15%, and cluster them in a region 500 miles in diameter.

WSJ errs in dubbing this a "dense pack"—an ill-starred plan for basing the MX. Each of these missiles is surrounded by 6,000 times as much area as in a dense pack.

The low satellite numbers stated by Canavan and others have assumed zero time required for a laser to slew its 30-foot diameter mirror from one target to another. My calculation includes this retarget time. For 3,000 fast-burn boosters with 40-second boost phase, and with a laser retarget time of 0.5 second, some 1,400 laser battle stations are needed. For the SDI Program goal of 0.1 second, 1,000 battle stations are required. A "several-billion-dollar" laser satellite needed for every two or three $10 million missiles is not a tolerable bargain.

WSJ blunders in comparing our assumed 25-megawatt laser with a 100-megawatt laser recently demonstrated. My camera flash puts out as much power as a bank of 2,000 250-watt ~~flash~~ lamps, but its half-megawatt is not so useful in cooking a booster. Likewise the "100-megawatt free-electron laser."

The "increased research Mr. Reagan wants on Star Wars" is not needed for resolving these arguments. It is not a shortage of money but a lack of quality of thought which bedevils both the Star Wars Program and The Wall Street Journal.

RICHARD L. GARWIN

Yorktown Heights, N.Y.

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WALL STREET JOURNAL— 04/05/85

REVIEW & OUTLOOK

Real Whistle Blowers

"Whistle blowers" who leak word of a CIA plot or costly toilet seat have been lionized by an adoring press, and often rightly so. Few media horns have tooted, though, for these two whistle blowers: Gregory Canavan, scientist at the Los Alamos defense labs; and Daniel O. Graham, former head of U.S. Defense Intelligence. Each has done battle lately against rather highhanded attempts to manipulate the Star Wars debate.

Gen. Graham recently quit a panel of the Office of Technology Assessment, soon to release what it calls a "balanced . . . objective" paper on Star Wars. History suggests it will be anything but. Brainchild of Sen. Edward Kennedy, OTA has already sponsored one assault on Star Wars, a 1984 "Background Paper" by outspoken critic Ashton Carter.

For 1985, OTA picked a "bipartisan" panel to write a report, including two Star Wars backers, Gen. Graham and Colin Gray, and eight leading opponents, including Robert McNamara, Richard Garwin and Gerard Smith. After fighting these odds in meetings and memos for months, Gen. Graham received a staff draft of the report for input and corrections. Paragraph one frames the debate by asking whether the U.S. would be better off "attempting" a defense or "keeping" the ABM treaty that "bans" such defenses. A "suggested goal" of Star Wars proponents, the paper says, is that defense would allow the U.S. to "credibly threaten . . . use of offensive nuclear weapons."

Well, the ABM treaty can't be "kept" because the Soviets already have broken it. And real Star Wars backers want to make offensive weapons obsolete.

With the panel stacked, and minority reports outlawed, Gen. Graham decided to tell some members of Congress about the process. When the OTA's chief then wrote Gen. Graham blasting him for this "violation," i.e., telling Congress what its office is doing, Gen. Graham resigned. Sen. Richard Lugar has since suggested OTA remove the biased passages. But Congress should ask the prior question: whether this tendentious $15 million agency should be axed.

Mr. Garwin also figures into the tale of Mr. Canavan. Both have been involved in a lively debate on "constellation size." That is, given certain assumptions about Soviet missiles and U.S. technology, how many satellites will it take to build a defense? In his zeal to press his own view, Mr. Garwin has used in public debate analysis already discredited, it seems, in secret debate among scientists.

Mr. Garwin and the Union of Concerned Scientists originally said 2,200 to 2,400 satellites would be needed, part of an "insoluble basing dilemma." Weeks later, one of Mr. Garwin's co-authors, Hans Bethe, lowered the number to 800. Then, in a book, the UCS group puts the number at 300. At other points, Mr. Garwin has gone as low as 165. Mr. Canavan and others have consistently put fleet size at between 60 and 100. Garwin and Co. say this issue is minor. Yet the difference between 60 and 2,200 satellites, at say $500 million per satellite, is that between a Star Wars cost of $30 billion and $1 trillion.

On Jan. 10, a panel of top defense scientists met in classified session to discuss the issue. Mr. Canavan took Mr. Garwin's numbers, and, correcting for what he described as two unreasonable inputs, observed that Mr. Garwin's estimate "converged" to his own answer of 100 or less. The original figure of 2,200 or more satellites, it turned out, was now based on setting up a whole new problem with different, implausible, parameters: the Soviets stuff all missiles into a "dense pack", they achieve a boost phase one-third the present time; and so on. The panel found, as has an independent referee from Cornell, that for the real problem, the answer is 100 or less. Mr. Garwin conceded but said the assumptions framing the two-year debate were wrong anyway.

Yet Jan. 12, at a public conference, Mr. Garwin argued that Star Wars requires "thousands of satellites," using the very charts presented to the Jan. 10 meeting and hinting that his numbers had serious scientific support. He was politely rebuked by Mr. Canavan, who happened to be in the audience. Military Space, a newsletter followed by space professionals, recently outlined the ongoing exchange in detail.

Mr. Garwin's problems with his colleagues are, of course, partly the result of assumptions he deems more appropriate to the problem. But he and his UCS colleagues have also proven a bit pessimistic in ruling out the possibility for technical advances. A fall UCS study refers to a 25-megawatt chemical laser as "well beyond the state of the art." Recently, Livermore Labs tested a 100-megawatt, free-electron laser. For those who dismiss defense as contrary to "fundamental laws," then, a caveat: The "fundamentals" are themselves changing rapidly.

And that, come to think of it, is a good argument for the increased research Mr. Reagan wants on Star Wars: It will allow scientists like Messrs. Canavan and Garwin to flesh out their arguments and arrive at the scientific truth. If only by opening up this vital and ongoing technical debate, Gen. Graham and Mr. Canavan have provided an important service.

Dr. Jastrow uses a bit of innuendo on Page 88 of the transcript:

> "As to how this happened, I can only say only after public attention was drawn to these large areas of the UCS estimate of satellite constellation that the Union of Concerned Scientists decided satellites are unimportant and countermeasures are really what matters, although when they first came out with their report on thousands of satellites they gave a very prominent place to that number on page 2 of the report. The countermeasures came later."

In fact, in the original UCS report distributed March 1984, on Page 2 and several lines before the examples of technical results such as number of lasers, we find the caution-- "Above all, we assume that the Soviet's forces remain static-- that they do not build more missiles or install any countermeasures." Indeed, the reader is later advised to skip the details and to look at the important question-- countermeasures. So I think that it is incorrect to suggest that countermeasures are a later concern of UCS or of me. They were our primary concern from the very beginning.

Finally, I wish to comment on Dr. Gray's query on Page 98 of the transcript--

> "Why the Soviet Union would anticipate any gain from 'going first' in a crisis-- even if they should do better going first rather than second i.e., why would they expect to do well enough?"

But the Members of the Committee may recall the late 1970s and the early 1980s when the "window of vulnerability" of Minuteman was put in just such terms-- the Soviet Union could be destroyed by surviving warheads on submarines or aircraft, but would be tempted to go first if by so doing they would be better off than we after the strike-- not better off than they were before. Dr. Gray shows good sense in 1985 on this question-- too bad NSDM 242 and other statements of national goals have emphasized the opposite-- that starting from a position of parody, the Soviet Union should not be able to destroy more US forces than it loses-- a totally unnecessary additional requirement for deterrence-- which, as Dr. Gray suggests, involves the comparison of the situation of the Soviet Union as a nation before the strike and as rubble afterwards-- even if they should come out of it with more nuclear warheads than the United States.

Mr. Chairman, thank you for the opportunity to comment on these matters and to provide my best judgment to help you in your heavy responsibility.

Sincerely yours,

Richard L. Garwin rsw

Richard L. Garwin
Forwarded in his absence

QUESTIONS SUBMITTED TO RICHARD L. GARWIN

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This is my response for the record to the questions transmitted by Mr. Dwight Dyer with a cover letter of 04/25/85, and to one transmitted by Senator Mark Andrews 04/22/85. I shall repeat the questions.

> Q1: Haven't the various DOD, DOE and external analyses (such as Union of Concerned Scientists, OTA and the Soviet Committee) converged on all basic calculations in the sense that for the same input assumptions and parameters they produce the same results to within 20-30 percent?

A1: I have reviewed in detail only the calculations published by the UCS, myself, C.T. Cunningham of the Lawrence Livermore Laboratory (August 1984), G.H. Canavan of the Los Alamos National Laboratory, and Ashton Carter in his Background Paper of April 1984. None of the calculations are design studies-- they are all examples. With the exception of the calculations of G.H. Canavan, they are all "right" for what they purport to calculate. For instance, the laser satellite numbers of UCS (March 1984) and Canavan (May and August 1984) assume satellites uniformly distributed worldwide. With this assumption, three times as many satellites are needed as if one had chosen specialized orbits to concentrate on Soviet IBM launch regions. The satellites of UCS (March, April, and October 1984) are deployed at 1000-km altitude, as were those of Carter (April 1984). When Cunningham assumes satellite deployment at 300-km altitude, he finds fewer required, but he notes that the assumption of "negligible retarget time" for 1000-km altitude (less than 4 seconds or so) must be replaced by an assumption of less than 0.042 seconds.

Similarly, the UCS calculations of March and April 1984 assumed illuminating each booster for the time required to kill it at design range of 3000 km-- some 7 seconds. Those of 10/84 (like those of Canavan of May and August) assume cooking a booster for only so long as is expected to be required to kill it (0.7 seconds at 1000 km; less at shorter distances).

Only the detailed calculations of Canavan (August 1984) contain an outright error-- in not properly adding the time required for a single satellite to kill a number of boosters. A calculation adding the required times and placing the satellites in optimum orbit for this calculation without the error would require 3 times fewer satellites than Canavan estimated (coincidentally compensating for his having deployed satellites worldwide).

The "baseline case" often repeated by Dr. Canavan and quoted by the press from the SDI Program Office arbitrarily assumes that satellites are confined to shoot only at boosters closer to them than to any other satellite-- even if the other satellite is idle. Furthermore, it makes no sense to consider the effectiveness of laser-bearing satellites which one might have in 20 or 30 years against a "baseline" of Soviet boosters in existing numbers and locations.

> Q2: Why do you use retarget times measured in seconds rather than the SDI goals of less than 0.1 second?

A2: There is no assurance that the SDI will reach its "goal" of less than 0.1 second for the time required to slew the beam and stabilize it to the requisite accuracy. Figure 1 of my testimony shows the influence of satellite retarget times ranging from 0.01 seconds up to 5 seconds. Table I of my testimony includes 4 entries for the SDI goal of 0.1 second retarget time, showing that against 3000 boosters with 40-sec engagement time 1003 laser battle stations in optimum orbit would be required to counter the boosters spread over a region of substantial size.

As one adopts more and more challenging goals for the program, the likelihood of achieving those goals becomes less and the cost of achieving them increases. Remember that the goal of the space shuttle was $50 per pound of payload launched into low earth orbit. Without recovering research and development expenditures, the cost now is at least $1500 per pound and more likely $3000 per pound. One makes very wrong decisions when one bases them on hopes instead of on what can reasonably be accomplished.

> Q3: Why do you perform all your calculations under the assumption that all the missiles are launched from a point, ignoring the penalties associated with such a configuration?

A3: I do not perform all my calculations assuming that all the ICBMs are launched from a point. Table I, for instance, shows approximate calculations for boosters distributed over 10 million square kilometers (satellite density s' and satellite numbers S'). But the problem in warfare is handling an adversary who does not want to be overcome; hence the designer of a weapon has to reckon with feasible countermeasures. Although there are some penalties associated with clustered launch, there are indeed some benefits-- including the greater feasibility of defense, the increased benefit to the offense of punching a hole of limited size in the defensive constellation, and the like. Since clustered launch of fast-burn boosters is an effective and likely response to a constellation of defensive satellites, it would hardly advance US national security to ignore this response.

> Q4: Is it true that the published UCS articles, when corrected to use the SDI's performance goals, produce evaluations of the strategic defense technologies that are at worst neutral and often quite positive?

A4: The "SDI performance goals" have, so far as I know, never been published. In some cases, they are at best hopes. It is misleading to say "when corrected to use the SDI's performance goals..." Perhaps better would be to say "When extrapolated...". But the calculations are already enormously optimistic, assuming no vulnerability of the satellite constellation, often no cost for satellites themselves, very small satellite masses, perfect pointing, in some cases zero retarget time, no booster rotation, no booster cooling by radiation, and the like.

> Q5: Recent press reports indicate that the SDI office has "worst-cased" SDI against the maximum threat presumed by UCS and others, and still ended up with less than a 100 satellite requirement.

A5: I have no information as to the validity of the press report indicated. The single example of SDI-chosen worst-case to which I refer later cites 129 satellites against 1400 fast-burn boosters. A 1400-booster deployment costing the Soviets $14B is hardly a worst case! The actual cost of silo-based fast-burn boosters is treated in my later letter for the record, in response to Dr. Jastrow's testimony.

> Q6: Do you think that the SDI office is understating the number of satellites required for a strategic defense system?

A6: I have never seen a report from the SDI Program Office giving an analysis of required satellite numbers. In a meeting at the SDI Program Office January 16, 1985, SDI staff did show some summary numbers. They agreed to send me copies of the transparencies, and after several telephone calls of reminder, I received copies of 5 transparencies. However, several more telephone calls have still not illicited a copy of the sixth transparency tabulating satellite requirements against point-launch fast-burn boosters. In a single example of "worst case" against fast-burn boosters, the SDI transparency assumed an oxygen-iodine laser of almost 4 times the performance of the assumed hydrogen-fluorine laser, and only 1400 fast-burn boosters. Their quoted number of 129 laser battle stations becomes 1028 required against 3000 fast-burn boosters if the laser battle stations are the same assumed in Figure 1 of my testimony. The number shown in Table I of my testimony is 1003. If it is the SDI Program Office judgment that the Soviet Union would be limited to 1400 fast-burn boosters as the "worst case," then I do conclude that "the SDI office is understating the number of satellites required."

> Q7: You have often argued that the President's originally stated goal was to "replace deterrence" with SDI, but that the Administration now wants only to "enhance deterrence." Recently the President said he was not enhancing deterrence with SDI, but "creating a new deterrence." Do you see any difference between the President's original statement and this new one?

A7: Yes, in the President's speech of 03/23/83, he contrasted his new departure with the old approach of "deterrence of aggression through the promise of retaliation." His dream was not to provide protection for our own ICBMs, so that they would be able to join our submarine-launched warheads in retaliation; nor was it to deter by "reducing confidence in Soviet achievement of some limited goal of nuclear attack." The promise of the program which he initiated was to free the American people of the possibility of destruction by nuclear-armed strategic ballistic missiles, and it is that promise which has evaporated as the SDI is oriented now toward reinforcing deterrence rather than replacing deterrence.

> Q8: I know that you support an R&D program for ballistic missile defense as a hedge against a Soviet breakout in these technologies. Do you think the $3.7 billion requested for this year is an appropriate funding level for research? Do you think the scientific community can effectively spend that much money in a single year?

A8: First, I want to make sure that we are doing the research which is best suited toward countering a Soviet "breakout" of any kind which would reduce the effectiveness of our strategic weapons. Just as I believe that countermeasures to the programs of the SDI are easier to achieve than the defenses, so I believe that it is surest for us to emphasize countermeasures to potential Soviet defenses. This is not part of the SDI program, and that is one of the reasons why the SDI program (oriented, as it is, to defense only) is very likely to impair rather than to improve our national security. I believe that a constant level of research of about $1.5 billion for each of the next ten years will provide research and tests of penetration aids, investigations of technologies which would be useful in improving our satellite observation and warning capabilities, together with an exploratory investigation of fields in which the Soviet Union might be feared to make advances.

We don't want to make those advances for the Soviet Union.

Reinforcing deterrence by improving the survivability of Minuteman will be a hollow achievement if the defenses by which we accomplish that reduce the effectiveness of Minuteman and SLBMs by a factor 2 or more.

> Q9: Dr. Garwin, we hear a lot from the folks in the SDI organization about all the promising new technologies that make a Star Wars system a realistic alternative. Can you put this in perspective for us? Can you give us a capsule summary of where we are now in Star Wars technology and how far we're away from having the technology to deploy a militarily effective Star Wars system? And in making your response can you categorize it in terms of the critical technological hurdles Star Wars would face:
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> 1. Surveillance, acquisition and tracking
> 2. Directed and kinetic energy weapons technology
> 3. Battle management and control of the entire system
> 4. The scaling and power requirements needed
> 5. The survivability of the system

A9: The best capsule summary of "how far away we are from having the technology to deploy a military effective Star Wars system" is contained in the testimony of Undersecretary of Defense for Research and Engineering Dr. Richard DeLauer of November 10, 1983 to the House Armed Services Committee (HASC 98-21, page 17). Dr. DeLauer testified, "Every single one of these blocks that I have on the Viewgraph is equivalent to or greater than the Manhattan Project. People have talked about the Apollo Program..." Since the Manhattan Project or the Apollo Program is (either one of them) some $20-30 billion in 1985 dollars, 8 such programs would require the expenditure of $160-240 billion to bring the technology into being. This would still not provide a defense, but only the knowledge as to whether we could build a defense. Considering that the SDI budget last year was only $1.4 billion (and of that only a few percent has apparently been expended), and that the 5-year request is "only" $26 billion, one can see how very far we are from having the technology available, at least in Dr. DeLauer's informed view.

But the primary problem, in any case, is countermeasures. If at enormous cost one would build a system to observe with scrupulous detail all of the visible activities of the deployment from a MIRV bus, that system could be defeated by carrying out these deployments in a cloud of carbon smoke or under a thin foil shield.

To select a couple of the items requested-- one assumes laser power output of 25 megawatts, and if that is to be derived from electrical power at 6% efficiency, some 400 megawatts of electrical power is required for a single laser. The Administration is just organizing a program to specify and investigate a 0.1 megawatt space power supply.

As for survivability, my testimony very specifically noted that the space-based BMD system proposed by Brzezinski, Jastrow, and Kampelman in their New York Times Magazine article of 01/27/85, even if it worked perfectly and were not countered by space mines in orbit to destroy the defensive satellites, or by other means, would be countered totally by the nuclear-armed Galosh Ballistic Missile Defense interceptor which has been deployed around Moscow for more than 15 years. In his presentation and remarks at the Hearing, Dr. Jastrow did not respond in any way to this analysis.

> Q10: The bottom line for the American public is not so much will Star Wars work, but will Star Wars protect all Americans and their allies from nuclear weapons exploding on them? Can a Star Wars system be deployed that will protect the American public from all nuclear weapons? If not, what kind of devastation could we expect in a conflict with the Soviet Union if both sides had a deployed Star Wars system?

A10: No critic or supporter of Star Wars offers hope that the President's original dream can be realized-- that of protecting the US public from Soviet nuclear weapons, even those from strategic ballistic missiles. The problem is not an absence of technology, but the presence of countermeasures and also of means to bypass the system, just as the German armies in World War II bypassed the Maignot line.

Nevertheless, if both sides had a deployed Star Wars system, in my opinion nuclear war would be far more probable and also more destructive, since measures would have been undertaken on either side to overcome the system while it was in the process of being deployed, and the systems would be prime targets for one another. Star Wars would very likely increase the devastation if war comes, just as the Soviet Moscow ABM System will increase the devastation of Moscow, in view of the many more warheads which will be targeted against Moscow.

> Q11: As Paul Nitze has said, one of the critical hurdles Star Wars faces is making the defense more cost effective than the offense, which everyone agrees it presently is not. Star Wars proponents insist that they can develop a system where the defense is more cost effective than the offense. Is this realistic?

A11: Whether a defense is more cost effective than the offense depends very much on the degree of perfection required of the defense, and also on what is defended For instance, consider a hypothetical case in which the Soviet Union wishes to achieve some level of destruction of the Minuteman silos by launching one fairly accurate and reliable reentry vehicle against each silo. Whatever that level of destruction, 1000 RVs are required. If now the United States has a single interceptor which it uses to defend one or another of the silos ("preferential defense,") but does not tell the Soviet Union which silo is to be defended, and if the reentry vehicles were perfectly accurate and perfectly reliable, then the Soviet Union would have to respond by adding 1000 RVs in order to be sure of overcoming the single interceptor. One can imagine the SDI program being conducted for 10 years and expending $70 billion, and then concluding that there are some kinds of defense for which the defense is cheaper than the compensating offense. We not only know that right now, but we can even build such defenses (of Minuteman).

It is not realistic to be able to deploy a survivable defense which will allow US society to survive in the face of Soviet nuclear attack, at a cost which is less than the offense required to overcome it.

> Q12: Let's look at the technical problems raised by some of these Star Wars project. Under the Surveillance Program we have the Optical Surveillance Experiment which will be a demonstration project showing the technical feasibility of using optical sensors on an airborne platform. Setting aside for the moment the question of whether demonstrating this airborne optical system will bump up against the ABM Treaty, aren't there serious technical questions as to whether an airborne optical system is the best way to go? Wouldn't it be extremely vulnerable in a nuclear environment? Wouldn't pop-up sensors be a more survivable alternative?

A12: A Soviet space-based surveillance system would have an easier job of tracking large aircraft carrying optical sensors for BMD than of tracking RVs and distinguishing them from decoys. And aircraft are a far more fragile and valuable target than are our RVs or decoys; therefore the aircraft will be highly vulnerable. Furthermore, integrating the optical sensor with the aircraft requires that it be able to work at jet speeds through the atmospheric boundary layer.

In wartime the peacetime advantages of aircraft--substantial on-station time and the ability to be recycled--are almost certainly outweighed by the lower cost and better performance associated with pop-up sensors.

> Q13: It has been said that much of the research being conducted under the surveillance program could have a spinoff value for verification and early warning. This may be true. But isn't it also true that the surveillance research is going beyond what the Air Force has said is required to conduct adequate verification and early warning?

A13: The requirements for surveillance and birth-to-death tracking for the SDI layered defense far exceed what is required for verification and early warning. When one looks for benefits from spinoff of a program which is very costly and long term, one *delays* the acquisition of valuable capabilities. In fact, the survivable satellite infrared early warning system described in my article in *International Security*, Volume IV, Number 3 (pages 117-139) consists of very many *small* satellites, together with many decoys and "dark" operable satellites which look like the decoys. It would not be feasible or cost-effective to replicate satellites of enormous capability.

This is only one way in which advanced, survivable early warning systems differ from those required for the SDI. Another difference is that satellites for treaty verification have no need to operate in a background of nuclear explosions; nor need they be defended against attack. Needed advances should be built *now,* not wait for the SDI research.

> Q14: There seems to be widespread concern within the scientific community over the value of space-based chemical lasers, because of their vulnerability and the fact that so much hardware and chemicals would have to be put in space for such a system. Even Dr. Edward Teller, an enthusiastic supporter of Star Wars, has said that space-based chemical lasers are not the way to go. Yet under the Administration's SDI budget request, we are plunging ahead with a demonstration project with space-based chemical lasers and we're doubling the budget for these type of lasers in FY86. What are the problems with space-based chemical lasers and should we be doubling their budget?

A14: The question states very well the problems with space-based chemical lasers. They are vulnerable, costly, and can neither be popped up nor fragmented into many stations for survivability. In the Stanford Workshop Report which Dr. Drell has presented, we recommend that the chemical laser program be removed from the SDI.

> Q15: There has been a good deal of controversy over how many chemical laser battle stations would have to be placed in orbit to cover Soviet ICBMs. The numbers have ranged from 100 to 1000. Since these battle stations would be sitting ducks, isn't the real question not how many we would have to put up but the fact that whatever we put up would likely be shot down?

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A15: In fact, Table I in my testimony indicates that many more lasers than 1000 would be required (even in optimum orbit), if the Soviet Union did what they readily could accomplish, and deployed not 3000 but 10,000 fast-burn boosters. Under those circumstances a 3-second retarget time would result in a requirement for more than 6000 laser battle stations, while a 0.1-sec retarget time would still require some 3300 laser battle stations.

As I indicated, chemical lasers have the problem that with their very large mirrors they are fundamentally costly each, unlike, for instance, rockets based on satellites, which can be partitioned without very great cost impact among much larger numbers of satellites. Hence they can be destroyed relatively cheaply-- for instance by space mines always within lethal range.

Q16: The Nuclear-Driven Directed Energy project envisions space-based laser battle stations powered by nuclear explosions. Setting aside for the moment the technical feasibility of this system, can you ever imagine the American public ever accepting hundreds of nuclear bombs floating over them in space? Or more importantly, can you ever conceive of the Soviet Union going along with having hundreds of US nuclear bombs floating in space over their country?

A16: I believe that Professor Teller extends his antipathy against space-based defenses to space-based x-ray lasers. And, of course, if the x-ray lasers are based in low earth orbit, many of them will be out of sight of their targets.

Unfortunately, x-ray lasers based on the ground are out of sight of their boost-phase targets for reasonable basing distances, and for reasonably short-burn boosters.

The Outer Space Treaty forbids nuclear weapons in orbit. On the other hand, both the Soviet Union and the United States have tolerated ICBMs on the ground in the other nation capable of causing enormous damage. And this tolerance extends to nuclear-armed sub-launched missiles in the open sea. Once space has been de-nuclearized (as it has been), however, I cannot see either side willingly accepting nuclear dominance of space by the other side, and I do not look forward to having two or more nations with nuclear weapons in orbit.

Q17: Would you give us your assessment of the High Frontier concept of space-based kinetic kill vehicles? There seems to be a widespread feeling in the technical community, even among SDI supporters, that such a system has all the problems of space-based chemical laser yet even more because it would take longer for the rocket projectiles to reach their targets. Yet I see that the funding level for space-based kinetic kill vehicle research would increase under the Administration's proposal by almost 400% in FY86. Is such a huge increase wise at this point, considering all the problems associated with High Frontier?

A17: Space-based homing kill vehicles (HKV) or kinetic (energy) kill vehicles (KKV) have many problems. For use against ICBMs or SLBMs in boost phase, the problem of seeing the target is eased, and neither the space truck nor the KKV need have cooled optics. On the other hand, the problem of reaching even a normal ICBM still in boost phase is difficult, as exemplified by the fact that the High Frontier proposal as detailed in the book, "The Non-nuclear Defense of Cities: The High Frontier Space-based Defense Against ICBM Attack" required that the rockets be fired from their space trucks 53 seconds before the ICBMs were launched. Furthermore, the KKVs in the High Frontier approach had an added velocity of only about 1 km/s, so that very many more satellites were required than in the Brzezinski, Jastrow, Kampelman approach with an added velocity of 8-10 km/s. Both KKVs would still have much of the satellite orbital velocity of 8 km/s, and so would blind themselves if they tried to intercept within the atmosphere at the 80-km/s altitude of burnout of a fast-burn booster.

So boost-phase intercept of a Soviet ICBM or SLBM force responding to the deployment of a space-based rocket defense is not going to be feasible.

As indicated in my testimony, large satellites with many rockets are totally vulnerable to nuclear-armed interceptor attack, the Galosh, for instance, being a fast-burn booster, and the cold Galosh warhead being invisible to the simple short-wave infrared sensors of a KKV.

For mid-course intercept of the RVs moving toward their targets, KKVs can be used from a much greater distance, in view of the 30-min flight time of an ICBM. However, the cooled sensor required for detection of a room-temperature RV would be at present difficult and costly to supply for each of the many many thousands of KKVs required. Furthermore, it is easy to provide decoys in space which look exactly like the balloon-enclosed RVs, so that a force of 10,000 RVs could readily be accompanied by 1 million decoys, and require the stationing on-orbit of 10 million KKVs. Each Brzezinski-Jastrow-Kampelman KKV is launched by a 500-pound rocket, and if 1000 of these are required per booster (100 decoys times a factor 10 absentee ratio), it is clearly not cost-competitive to require that the destruction of a single booster be countered by the continued orbiting of 500,000 pounds of rockets. A large booster which can launch 10,000 pounds of reentry vehicles can launch less than 10,000 pounds of defensive rockets into orbit, and the cost-exchange ratio of more than 50 to 1 (not counting vulnerability of the satellite-based system) is not attractive to the defense.

Finally, pop-up KKVs for endo-atmospheric terminal defense have the problem of seeing through the heated atmosphere. It is much easier to make the intercept exoatmospherically as the RVs (and decoys) fall toward their targets. The problem here also is the vast number of decoys which must be intercepted, but at least one does not need to give the KKVs a permanent home in space, with all the cost that entails. The problem is still decoys, nuclear explosions in the background to blind the KKVs, and so on.

Note, however, that space-based railguns propelling KKVs at speeds less than 20 km/s are clearly inferior to the chemically propelled rockets we know how to build. Even at 7 times the rocket exhaust velocity (17.5-20 km/s), a KKV has 4.5% of the energy of the propellant from the big rocket used to accelerate it. If that same propellant were used at 30% efficiency to generate electrical energy, a railgun would have to be 15% efficient in its acceleration in order to compete. Furthermore, the KKV accelerated by a chemical rocket does not need the enormous development costs and super strengthening required to stand the more-than-gunlike acceleration of a railgun.

Report Number 13 of the program in Science & Technology for International Security (Massachusetts Institute of Technology 20A-011) Cambridge, MA 02139, "Analysis of the High Frontier BMD Proposal," by Eric Raiten (March 1985) is a more thorough analysis of the High-Frontier Proposal. There is no doubt that a space-based rocket defense could be built; indeed, proposals to do this have been around since the 1950s. But as it has become cheaper to build such defenses, it has become cheaper also to penetrate such defenses. The leader of the High Frontier effort, General Daniel O. Graham is frank to say that it offers no hope of a perfect defense. He says "... but I see no reason to take away a retaliatory capability from the Soviet Union, and that is why you can afford an imperfect defense good enough so that no Marshal or General sitting in the Kremlin can figure out a way to first strike the United States." But the Scowcroft Commission reports of April 1983 and March 1984 very clearly make the point that there is no way the Soviet Union can "first strike" the United States in any meaningful manner, even without defense. By "first strike," we mean to eliminate the possibility of retaliation, and that is guaranteed by our bombers, cruise missiles, and submarine-based retaliatory force.

The very large SDI funding stands in the way of a sensible approach to exoatmospheric defense with homing kill vehicles-- a long-range, multi-pronged approach to building these HKV with an overall mass of 10 grams instead of 10 kilograms.

> Q18: Dr. Garwin, in the DOD publication, Soviet Military Power, there is a chapter devoted to Soviet strategic defense and space programs. The chapter shows how the Soviets are making major improvements in strategic defenses and ABM-related developments.
>
> -- In general terms, Dr. Garwin, can you outline for this subcommittee some arms control regimes that might be mutually agreeable for the US and Soviet Union, and that could contain these technology developments from becoming reality?

A18: It should be noted that the "strategic defense" effort in the Soviet Union includes the vast amount spent by the Soviet Union for the operation of its air defense and existing Moscow ABM systems, as well as for civil defense and the upgrading of the systems-- totally within the confines of the ABM Treaty and without any hope to interfere with the penetration of US strategic ballistic missile warheads.

The "Report to the Congress on the Strategic Defense Initiative -- 1985" with its Appendices A, B, and C, makes it clear that the Administration proposes to test BMD technology simply by dubbing it ASAT-related, or by arguing that, "For example, the experimental devices may measure the signatures of booster plumes, but not in real time." (Page B-7). Therefore, if the ABM Treaty is to protect the United States against this same kind of activity on the part of the Soviet Union (legitimized by the statements of the US Government) we must stop immediately this sham and, instead, use vigilantly the means provided by the ABM Treaty-- the Standing Consultative Commission-- to compel compliance.

There is an arms control regime readily available which will reinforce the security of the United States, prevent the erosion of deterrence, and prevent the evolution of the deterrent regime to one which depends upon a rapid response.

1. Reaffirm our adherence to the ABM Treaty and demand strict compliance with it by both sides. (Pseudo-legal exploitation of loopholes by the US is the quickest way to worsen compliance with the Treaty by the Soviet Union).

2. Urgently negotiate a ban on test of anti-satellite weapons and on the deployment of weapons in space, as contained in the draft treaty I assisted in presenting to the Senate Foreign Relations Committee May 18, 1983. I attach a copy of that treaty proposal, which has since been incorporated in large part in a Soviet draft proposal of August 22, 1983. Such a ban is adequately verifiable, in contradistinction to a ban on ASAT capabilities.

3. Declare a moratorium on ASAT tests so long as the Soviet Union complies with its own declared moratorium.

4. Recognize that the reductions in strategic arms to which President Reagan and we all aspire are impeded on both sides by the natural military tendency to desire and build forces for damage limitation-- the destruction of the nuclear retaliatory weapons on the other side after nuclear war begins. Far larger reductions than those proposed thus far-- to a level of 1000 or 2000 warheads on each side, from the present level of 10,000 strategic warheads and 25,000 nuclear weapons total on each side-- are available if we are willing (and the Soviets also) to give up "second-strike counterforce" and frankly not to demand superiority over the Soviet Union. Mutual superiority is not something which can be demonstrably achieved.

5. A Comprehensive Test Ban Treaty outlawing nuclear tests will allow us to more effectively prevent the spread of nuclear weapons to other nations.

I believe that the focusing of interest on the nuclear threat following the President's speech of March 23, 1983, and the near-universal agreement now that the purpose of nuclear weapons (or of the SDI) must be to maintain deterrence of nuclear war, offers us a new opportunity for major reductions in nuclear weapons in the near term. While some of the programs in the Strategic Defense Initiative, funded at a constant rate of about $1.4 billion per year, are compatible with and even supportive of this goal, the continued existence of the SDI Program is not.

A treaty limiting anti-satellite weapons

Article I

Each Party undertakes not to destroy, damage, render inoperable or change the flight trajectory of space objects of other States.

Article II

1. Each Party undertakes not to place in orbit around the Earth weapons for destroying, damaging, rendering inoperable, or changing the flight trajectory of space objects, or for damaging objects in the atmosphere or on the ground.

2. Each Party undertakes not to install such weapons on celestial bodies, or station such weapons in outer space in any other manner.

3. Each Party undertakes not to test such weapons in space or against space objects.

Article III

1. For the purpose of providing assurance of compliance with the provisions of this treaty, each Party shall use national technical means of verification at its disposal in a manner consistent with generally recognized principles of international law.

2. Verification by national technical means shall be supplemented, as appropriate, by such cooperative measures for contributing to the effectiveness of verification by national technical means as the Parties shall agree upon in the Standing Consultative Commission.

3. Each Party undertakes not to interfere with the national technical means of verification of the other Party operating in accordance with paragraph 1 of this Article.

4. Each Party undertakes not to use deliberate concealment measures which impede verification by national technical means of compliance with this treaty.

Article IV

1. To promote the objectives and implementation of the provisions of this treaty, the Parties shall use the Standing Consultative Commission, established by the Memorandum of Understanding Between the Government of the United States of America and the Government of the Union of Soviet Socialist Republics regarding the Establishment of a Standing Consultative Commission of December 21, 1972.

2. Within the framework of the Standing Consultative Commission, with respect to this treaty, the Parties will:

a) consider questions concerning compliance with the obligations assumed and related situations which may be considered ambiguous;

b) provide on a voluntary basis such information as either Party considers necessary to assure confidence in compliance with the obligations assumed;

c) consider questions involving unintended interference with national technical means of verification, and questions involving unintended impeding of verification by national technical means of compliance with the provisions of this treaty;

d) consider, as appropriate, cooperative measures contributing to the effectiveness of verification by national technical means;

e) consider possible changes in the strategic situation which have a bearing on the provisions of this treaty, including the activities of other States;

f) consider, as appropriate, possible proposals for further increasing the viability of this treaty, including proposals for amendments in accordance with the provisions of this treaty.

Article V

The Parties undertake to begin, promptly after the entry into force of this treaty, active negotiations with the objective of achieving, as soon as possible, agreement on further measures for the limitation and reduction of weapons subject to limitation in Article II of this treaty.

Article VI

In order to ensure the viability and effectiveness of this treaty, each Party undertakes not to circumvent the provisions of this treaty, through any other State or States, in any other manner.

Article VII

Each party undertakes not to assume any international obligation which would conflict with this treaty.

Article VIII

1. Each Party may propose amendments to this treaty.

2. Agreed amendments shall enter into force in accordance with the procedures governing the entry into force of this treaty.

Article IX

This treaty shall be of unlimited duration.

Article X

Each Party shall, in exercising its national sovereignty, have the right to withdraw from this treaty if it decides that extraordinary events related to the subject matter of this treaty have jeopardized its supreme interests. It shall give notice of its decisions to the other Party six months prior to withdrawal from the treaty. Such notice shall include a statement of the extraordinary events the notifying Party regards as having jeopardized its supreme interests.

Article XI

1. This treaty shall be subject to ratification in accordance with the constitutional procedures of each Party.

2. This treaty shall enter into force on the day of the exchange of instruments of ratification.

Article XII

1. Done in two copies, each in the English and Russian languages, both texts being equally authentic.

2. This treaty shall be registered pursuant to Article 102 of the Charter of the United Nations.

AVAILABLE

Dartmouth College

STATEMENT OF MR. ROBERT JASTROW, PROFESSOR OF EARTH SCIENCES, DARTMOUTH COLLEGE (FOUNDER, GOODARD INSTITUTE FOR SPACE STUDIES, WHICH DOES RESEARCH FOR NASA)

FAST BURN BOOSTER

Senator Rudman. The next witnesses are Dr. Colin Gray, president of the National Institute for Public Policy, and Dr. Robert Jastrow, professor of earth sciences, Dartmouth College, and also founder, Goodard Institute for Space Studies, which does research for NASA.

Mr. Jastrow. I am very pleased to be here. I have talked with Dr. Gray and we agreed I will make a short statement on technical points and then he will follow.

Senator Rudman. It is always good to have someone from Dartmouth before this committee.

Mr. Jastrow. I was going to read briefly from the statement I prepared, but I heard several things this morning which I would like to address in the beginning.

I called Jim Fletcher on Friday, because I have the impression from reading his report, that his name has been used and quotations have been taken out of context that convey the opposite to the intended meaning. So, I talked to him in particular about the fast-burn booster.

He said that the fast-burn booster was looked into by a number of contractors that advised his panel. After assessing these—I think there were four altogether—he came to the conclusion that this booster might be deployable by the Soviet Union in 15 or 20 years. That means in the 21st century.

He said it would cost as much as 10 times the warhead, the cost of an ordinary booster like the Midgetman, but it probably could cost 2 times as much. So, 2 to 10 times might be a range.

MIDGETMAN MISSILE COSTS

Two times was a fairly solid figure in his view. This is a very interesting remark because the Midgetman, if my numbers are right, is estimated to have a life cycle cost, basing, maintenance, and so on of $60 billion for a 1,000-Midgetman force. That is 1,000 warheads. That means $60 million per warhead.

If you take Jim Fletcher's factor of two, you get $120 million per warhead. Let us say in round numbers $100 million per warhead. I can't square this number, which is based on a higher level of information than I possess, with the number of $10 million per warhead for a fast-burn booster that has been put into the record of this discussion this morning.

SOVIET WORK ON LASER DEFENSE

Also in a related but separate connection, I called Los Alamos a few days ago because my curiosity was aroused by that well-known figure of 10,000 Soviet scientists and engineers working on military laser defense. I was curious to know how many dollars that translates into compared to the SDI budget.

So, the staff at Los Alamos told me thay have 3,000 scientists and engineers who cost them or the taxpayers $600 million. That translates into an interesting number for the increment from $1.4 billion to $3.7 billion—which I do on the back of the famous envelope that physicists like to carry with them——

Dr. Kerr equated $2.3 billion to 40,000 scientists and engineers. Maybe he did or didn't. When you take the Los Alamos numbers, they translate into 11,000 scientists and engineers, not a small number, but not 40,000.

I don't know what the resolution of that matter is or whether Dr. Kerr will stand behind that 40,000.

B-52 BOMBER PENETRATION OF SOVIET AIRSPACE

It was also stated B-52's will make it to their target without question. In 1981 Secretary Weinberger said in "Soviet Military Power," and I know the words by heart because I have used them several times, he said the B-52G's and H's will not be able effectively to penetrate the Soviet air defenses by the mid-1980's. The mid-1980's is now. I assume they cannot penetrate the Soviet air defenses.

ALCM

It is significant, by the way, that the Defense Department has canceled its order for ALCM's. Originally the order was 4,300. They canceled to 1,500, roughly. There is information in that act.

CRUISE MISSILE

One of the members of the committee mentioned cruise missiles. I believe there is some misunderstanding about them. My information from sources in SDI and in the weapons laboratories is that the cruise missile is vulnerable to just the kind of space-based defense that the SDI teams are developing because a cruise missile cannot be concealed well from space-based radars by stealth technology. A defense size to handle thousands of warheads moving at about 10,000 miles an hour finds it an easy task to track and destroy cruise missiles travelling at the speed of a commercial airliner. It is significant that the Defense Department canceled its order for 4,348 air-launched cruise missiles after buying only 1,499.

So, it is really correct to say, I believe, and this is the best information I have been able to derive from the professionals in the business, that when we have the kind of defense that Jim Fletcher proposed, if research shows it to be feasible, the defense—designed, by the way, to handle a threat cloud of thousands of warheads and hundreds of thousands of debris and decoys, to use Fletcher's own words, moving through space at 10,000 milies an hour—will find it possible to destroy the cruise missile ambling along at the speed of a commercial airliner. It is really not a big problem.

The other thing—ballistic missile defense—is the big problem.

Laser beams, go down to the ground, although they are blocked by clouds. But the bomber must fly its intercontinental mission above the clouds. It is very vulnerable to space defense.

The cruise missile files low. It can seek cover under the clouds. It is possible, but unlikely, that there will be uniform cloud cover for the many miles that separate the launch of that cruise missile from the target in the United States.

I think that this is a misunderstanding about the air-breathing threat that should be corrected.

I would be pleased to look through a transcript and identify mattes that seem to me to have been technical misstatements and enter the corrections as I see them, if I could do that.

Senator RUDMAN. That may be done.

[The information follows:]

CORRECTIONS OF RECORD

On pp. 35-36 of the transcript, Dr. Garwin states that studies done for the Fletcher Committee indicate a fast-burn Midgetman booster would cost 15 percent more than an "ordinary" Midgetman. Dr. Garwin proposes the fast-burn Midgetman as a Soviet countermeasure to our defense. He states that its cost would be $10 million per warhead.

This cost estimate is in error by a factor of 10.

Dr. Fletcher told me recently that on the basis of information available to him a fast-burn Midgetman could easily cost twice as much as an "ordinary" Midgetman. The life-cycle cost of the new Midgetman missile is estimated by the DoD to be about $50 million each in buys of 3000 missiles. This is not a "fast-burn" missile. Applying Dr. Fletcher's factor of two for the extra cost of the fast-burn, the cost of a fast-burn Midgetman will be about $100 million, or 10 times Dr. Garwin's estimate.

Replacement of the 3000 warheads in the Soviet SS-18 arsenal with 3000 fast-burn Midgetmen, which Dr. Garwin suggests as a specific Soviet action, would cost the Soviets not $30 billion as he implies, but $300 billion. Replacement of the entire fourth-generation Soviet ICBM force, variously estimated to include between 6000 and 8500 warheads, would cost the Soviets not $60 billion to $85 billion, as Dr. Garwin implies, but between $600 billion and $850 billion. By his extreme understatement of the cost of the "fast-burn" missile, Dr. Garwin makes his proposed fast-burn countermeasure seem far more attactive to the Soviets than it actually is.

Moreover, Dr. Fletcher tells me that the long-range program recommended by the Fletcher committee allowed for the "worst case" possibility that the Soviets would deploy a force of fast-burn boosters by the end of the century. So, if the Soviets actually scrap all their fourth-generation missiles, and all their fifth-generation missiles, and build a new arsenal of fast-burn missiles, that enormous effort and expense will gain them little or nothing.

Finally, on page 44 of the transcript Dr. Garwin states that a Soviet fast-burn missile force could be deployed in six years if the Soviets started today. General Abrahamson has stated that it will be well into the next century before such a force can be deployed by the Soviets. Dr. Garwin states that the reason for the disagreement is the General Abrahamson is "new to the field", i.e., does not understand the relevant technical facts.

But Dr. Fletcher gave me a time estimate for a Soviet fast-burn booster that agrees with General Abrahamson's estimate and does not agree at all with Dr. Garwin. Dr. Fletcher notes that it took the Soviets 10 to 15 years to build a mordern missile force after the shock of the Cuban missile crisis. He notes that the MX started development in 1972 and is still testing 13 years later. He estimates it might take the U.S. 10 years or more to do the major re-design needed for a fast-burn booster. He states that the best guess of most experts on this matter is that Soviet development of a fast-burn booster would take 15 to 20 years, i.e., into the next century. This is in agreement with General Abrahamson's statement.

Dr. Fletcher played a prominent role in the development of the Titan and Minuteman ICBMs. General Abrahamson was program manager for the Maverick air-to-air missile and program manager for the Space Shuttle. I believe the experience of these two individuals shows that they are highly knowledgeable on matters relating to missile engineering and development and their judgment on the time scale for the development of the fast-burn booster can be accepted as well-informed and authoritative.

Mr. JASTOW. Let met go on.

Extracting a few remarks from this prepared statement: my appearance here, is as a technician. There are other dimensions of this matter which Ambassador Smith and Dr. Gray can address better than I.

STRATEGY AND POLICY

I would like to make some remarks about two technical points. One blurs into the area of strategy and policy. That is the often-made remark that the Soviets could overwhelm our defenses, turn out SS-18's like sausages, as one journalist said.

Another is the statement that a less than perfect defense is less than useless and in fact a danger.

On this second matter it is interesting that heads I would consider wiser than mine in this area have come to realize the flaw in that remark. The remark is made by those who point out the destructiveness of the nuclear weapons, that even a few warheads getting through, would destroy many American cities.

KISSINGER VIEW ON MISSILE DEFENSE

Here is what Henry Kissinger said. He said:

> I was less than enthusiastic about President Reagan's "Star Wars" speech when I first read it. Even a 90-percent effective defense would still let enough weapons through to destroy an unacceptable proportion of our population.
>
> As I reflected, that argument struck me as more and more superficial.
>
> Even granting, as I do that a perfect defense of our population is almost certainly unattainable, the existence of some defense means that the attacker must plan on saturating it.
>
> This massively complicates the attacker's calculations. Anything that magnifies doubt inspires hesitation and adds to deterrence.

BRZEZINSKI VIEW ON MISSILE DEFENSE

Dr. Brzezinski has expressed similar views:

> Strategic defense . . . can increasingly complicate the planning and execution of an effective first strike . . . restoring the element of deterrent simply by creating again greater uncertainly.

I would like to put some quantitative teeth in those remarks. Suppose we have an 80-percent defense, a very conservative estimate for what might be gained by "Smart Rocks or Smart Bullets," off-the-shelf technology for the early 1990's.

EFFECTIVENESS OF DEFENSE SYSTEM

An 80-percent effective defense means we can shoot down four out of five Soviet warheads. Consider the meaning of that for the Soviet planner making his calculation of gains and losses. We knows the bulk of our nuclear forces will survive an attack. He knows if he attacks us with this massive first strike ICBM arsenal, in that case we will be able to strike back with the bulk of our nuclear weapons and reduce all major Soviet cities to rubble in 30 minutes.

Knowing that, he will not attack us if we have an 80 percent defense or 70 or 60 percent. It need only he good enough to guarantee survival of our nuclear retaliatory forces. Such defense would foreclose options of a first strike by Soviet leaders. I would think that would be a great relief to the American people to have such a defense. In the Soviet calculation of gains and losses, potential losses from an attack in which only one in five warheads would reach its target are bound to outweigh any gain.

But some of my scientist friends say, as well as other critics of the strategic defense initiative, that means we are only protecting missile silos, not the American people. This is a false dichotomy, because any defense that discourages the Soviet leadership from an attack will add to the protection of the American people.

But how much will it add to their protection?

I estimated $60 billion, again from informed sources, as the cost of a first-generation defense that ought to be at least 90 percent effective. What do you get for that $60 billion?

Here is what Dr. James Fletcher said—my former boss in NASA. an independent, well-informed man. In an article in the National Academy of Sciences journal issues in science and technology, Dr. Fletcher said it was clear to him as a result of his panel's study, that a two-layer system could be effective enough "to protect most, perhaps even 90 or 99 percent, of the Nation's population and infrastructure against full-scale nuclear attack."

Note that Dr. Fletcher did not say "missile silos;" he said "population and infrastructure."

Dr. Fletcher went on to say that a complete three- or four-layer defense of the kind that, he said, could be deployed incrementally beginning in the 1990s, would have the potential of "protecting nearly all of the population—perhaps even greater than 99 percent—against nuclear attacks." That would be a defense so close to perfection as to blur the difference.

This statement comes from a well-informed person. I spoke to Dr. Fletcher in January because I wanted to put that remark in an article I was preparing. I wanted to know if he had changed his mind.

He told me no, the statement remains his best judgment and he stood by it. I would like permission, to read the relevant section from his article in the National Academy of Sciences journal into the record of this discussion. It is not very long.

Senator **Rudman**. If you would like to.

[The information follows:]

EXTRACT FROM "TECHNOLOGIES FOR BALLISTIC MISSILE DEFENSE"

Issues In Science and Technology, Fall 1984

NATIONAL ACADEMY OF SCIENCES, WASHINGTON, DC

The technological challenges of strategic defense are great but not insurmountable. In the Defensive Technologies Study, we took an optimistic view of the emerging technologies and concluded that "a robust, multitiered ballistic missile [defense] system can eventually be made to work." We also realized that "the ultimate utility, effectiveness, cost, complexity, and degree of technical risk in this system will depend not only on the technology itself, but also on the extent to which the Soviet Union either agrees to mutual defense arrangements or offense limitations." For instance, if the Soviet Union agreed to reduce its force of intercontinental ballistic missiles, then an effective missile defense would be less expensive and would pose fewer technical challenges.

Although the complete, four-phase defense probably will not be feasible until after the year 2000, it may be possible to begin deploying portions of the system in the 1990s, should Congress and the president decide to do so. The technologies for terminal and midcourse defense are already relatively well understood. Indeed, it should be possible by the end of the decade to demonstrate some of the components for these defenses, including a space-based system for acquisition, pointing, and tracking; a megawatt-class, ground-based laser weapon operating at the visible light wavelength; an airborne sensing system; and a high-speed, non-nuclear interceptor to function within the atmosphere.

Such intermediate versions of a ballistic missile defense system, while unable to provide the protection available from a full, multitiered system, could nonetheless offer meaningful levels of defense, especially against limited nuclear attacks. Terminal or midcourse defenses could be deployed incrementally as part of the full, four-phase system. It would be essential to maintain effective, surivable offensive weapons in conjunction with these initial defense systems.

A terminal defense could provide protection for some high-value assets. The goal of most of the earlier terminal ABM concepts, such as Safeguard, the system partially installed in the early 1970s at the Grand Forks Air Force Base in North Dakota, was defense of our intercontinental ballistic missile silos, an approach known as hardpoint defense. The terminal defense systems now envisioned could be used to protect wider areas. These area defenses might be used to defend military forces, their command, control, and communication (C^3) facilities, and such support systems as munitions factories and power plants. In addition, a terminal defense system using near-term technology, such as non-nuclear interceptors and airborne surveillance, could perform well against shorter range missiles and could be appropriate for defense of our European allies.

A two-phase system, consisting of terminal and midcourse defenses, or possibly terminal and boost-phase defenses could be effective enough, in my opinion, to protect most—perhaps 90 or even 99 percent—of the nation's population and infrastructure, including factories, transportation and communication systems, and power supplies—even against a full-scale nuclear attack. It could also provide significant additional protection for military forces and C^3 facilities. If properly constructed, a two-layer system could provide enhanced deterrence, as it would reduce the utility of a missile attack. A key factor relating to the effectiveness of a ballistic missile defense is its cost-exchange ratio: the cost of the defense in relation to the cost of additional offensive measures to overcome it. This remains to be worked out for the two layer defense systems.

A complete four-phase system (or perhaps a three-phase boost, midcourse, and reentry system) has the potential for protecting nearly all of the population—perhaps even greater than 99 percent, in my opinion—against massive nuclear attacks. It could also provide a near-perfect defense against limited attacks. In addition, both of these multitiered systems could save most lives in the event that nuclear weapons were launched by accident or miscalculation or for some irrational, nonmilitary purpose.

There has been much confusion and public debate over the goals of the current Strategic Defense Initiative—whether it is a more limited defense of our strategic forces or a near-perfect population defense. The Defensive Technologies Study Team concluded that, in fact, the two goals are not contradictory. The new program has as its near-term goal the development of technologies for defense of our strategic forces, which would include, among other things, silos, submarine bases, air defenses, intelligence facilities, military bases, factories, and communication and power systems. However, the same area defense technologies for protecting large military installations can also be used to protect cities, and the ultimate goal of the new program is to develop the technical option to deploy a thoroughly reliable population defense for both the United States and its allies.

Since this new ballistic missile defense effort was first announced, it has been the subject of much public debate. I would like to address some of the misconceptions about this program and the technologies under development.

The public discussion of defensive technologies has tended to focus on the more exotic weapons, such as lasers and particle beams. In fact, only about 25 percent of the current research budget is devoted to directed-energy weapons. Less than half of the program is concerned with weapons at all; the largest single area is surveillance and tracking research. Although the precise architecture of a future ballistic missile defense system cannot be predicted at this time, it is entirely possible that such a system will not include any directed-energy weapons, relying instead of kinetic-energy weapons. Moreover, if the two superpowers agree to limitations of their offensive forces, then an effective defense might be constructed without any weapons in space.

Another misconception is that offensive countermeasures are so easy, cheap, and effective that no defensive system can be effective. This argument seems to rest on three principal assumptions: first, that simple proliferation of weapons and decoys is a cost-effective method of overwhelming any defense; second, that the Soviets can build a new generation of offensive missiles capable of evading boost-phase defenses; and third, that the space-based assets of the system are inherently vulnerable.

All of these assumptions were addressed early in the Defensive Technologies Study. In evaluating the feasibility of ballistic missile defense—and in defining performance goals for various components of the system—we assumed that the Soviet Union would expand its offensive force at the maximum pace possible. That would mean that within our lifetimes, the Soviet offensive force could grow to two or three times its present size.

Some critics have performed "systems analyses" that seem to show that ballistic missile defenses cannot work against this increased threat. However, in constructing their hypothetical defense systems, these critics have made fundamental errors in choosing the parameters and orbital placement of the space-based components. This has led them to overestimate by a factor of two to ten the number of required satellites. Furthermore, arbitrary performance assumptions are frequently made on laser power, mirror size, and lethal range.

The current research program is designed to demonstrate affordable technologies capable of handling an expanded Soviet offensive force. Until this work is complete, any "systems analyses" will be conjectural at best.

Furthermore, we also devoted substantial effort to defining the countermeasures that might be incorporated in a new generation of Soviet missiles, which presumably would be constructed in response to U.S. progress on a defense system. Of the potential countermeasures, the "fast-burn" booster, which could complete most of its boost-phase within the atmosphere, has perhaps been the most widely discussed.

Some critics assume that no defense system would be effective against the fast-burn boosters. However, several issues should be considered in evaluating the actual threat they pose. For one, the technical feasibility and cost of building (a new generation of missiles) has yet to be determined. In addition, a fast-burn booster might be less efficient and therefore limited to a smaller payload and fewer decoys and penetrations aids. These boosters might also be less accurate than existing Soviet intercontinental ballistic missiles.

Many of the boost-phase weapons now under development have substantial potential against fast-burn boosters. And it may well be true, given the limitations of fast-burn boosters, that a Soviet offensive force composed entirely of these missiles could be effectively countered by midcourse and terminal defense systems alone. Finally, if the Soviets are indeed faced with the possibility of completely replacing intercontinental and submarine-launched ballistic missiles, an excellent opportunity would exist for new and substantial arms limitation agreements.

Clearly, the potential threat of fast-burn boosters and all other countermeasures must be fully assessed. That assessment is one of the primary objectives of the current research and development program.

Another issue of concern is whether command and control for ballistic missile defense can be structured to allow national command authorities (the president and designated chain of command) to activate the system—especially the boost-phase system, which must respond minutes after a launch is detected. Extensive research will be required in this area. Nonetheless, it is by no means clear that a multilayered defense cannot be structured to allow human control.

An offensive strike would most likely be preceded by a crisis of some kind. The system can be structured so that it can be activated in stages during a crisis, much as our military forces are now activated. When the crisis reached a certain level, the president might choose to activate the terminal defenses. This would provide full presidential control of any weapons deployment. As the crisis intensified, the president might choose to activate the midcourse and ultimately the boost-phase defenses. These steps would be taken with the full knowledge of the opponent. The boost-phase defenses could be set to hold fire until a massive attack was unambiguously confirmed. Any lower intensity attacks could be handled by the midcourse and terminal defenses alone. Furthermore, even an "automatic" response of a boost-phase defense could be structured to allow the President to halt its activation at any point.

COST EFFECTIVENESS OF DEFENSE SYSTEM

Mr. JASTROW. The question then remains as to whether such defense will be cost effective. That has to do with the matter of overwhelming that defense, building new missiles like sausages. The prepared statement contains an analysis of the cost to the Soviets of doing this. The analysis indicates that an 80 percent defense, a very conservative number, would cost the Soviet a couple of trillion dollars to overwhelm.

What about the marginal costs? For every dollar we spend on defense, how many dollars does the Soviets have to spend in encountering that dollar's worth? The result, based on information gathered from SDIO, Los Alamos and Livermore, is that it would cost the Soviets $3, roughly, for every $1 we spend.

It is not true they can easily overwhelm our defense. The costs do not allow it. If they try, they will be bankrupt before we are.

Senator RUDMAN. I am not sure that is a breaking point yet.

The bottom line is that no matter how we look at the cost picture, the ratio of costs seems to favor defense over the offense. This is true for the Soviet response to our star wars or American response to the Soviet star wars.

I would say that no development could be more favorable to the cause of any nuclear arms race than eliminating nuclear weapons from the world than a defense which is cost effective and in place on both sides. That will convince both nations, and reasonable men would see, it seems to me, the futility of a continued competition in the building of offensive weapons of mass destruction.

That is the position of our negotiating team in Geneva, to my knowledge. Of course, we have not built this defense yet. It is all on paper. Well, not so; the Smart Rocks are not on paper; they exist. But the technology is promising.

SUPPORT FOR SDI PROGRAM

Furthermore, the American people want this defense. A poll sponsored by an educational foundation that I am connected with said 90 percent of the American people want the Government to defend them against Soviet missiles if we are attacked.

Seventy percent, according to the same poll, believe that we should be spending as much or more than we are now requesting, 1⅓ percent of our budget on defense, against Soviet missile attacks.

The people want it, and the technical prospects are promising.

Why do some of my colleagues and scientists oppose this program? That is a question that interests me because the underlying reasons always turn out to be technical.

It is true that only a handful of physicists with full clearances for SDI—I know only four—hold this view, whereas Drs. Fletcher and Keyworth, General Abrahamson and his staff, and hundreds—more likely thousands—of highly competent scientists and engineers at Livermore, Los Alamos, and other defense laboratories, all believe the program is sound.

Nonetheless, there is a seeming paradox in this disagreement, for competent scientists stand on both sides. The resolution of that paradox is important for Congress and for the people, who rely on the scientific community for expert advice on technical matters relating to the defense of the United States against nuclear attacks.

I have studied the technical issues and talked with individuals in the defense scientific community for much of the past year. I have

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come to the conclusion that it may be difficult for a person who spends only a part of his time on these complex matters—taking time off from teaching, research, and administration—to do as sound a job on the technical analysis as the individuals who are spending full time on the problem, have full computational support, and are backed by hundreds, or thousands, of colleagues.

What about myself? I am not trying to do my own analysis. I am only translating into lay understandable terms the research done in weapons laboratories and the Pentagon.

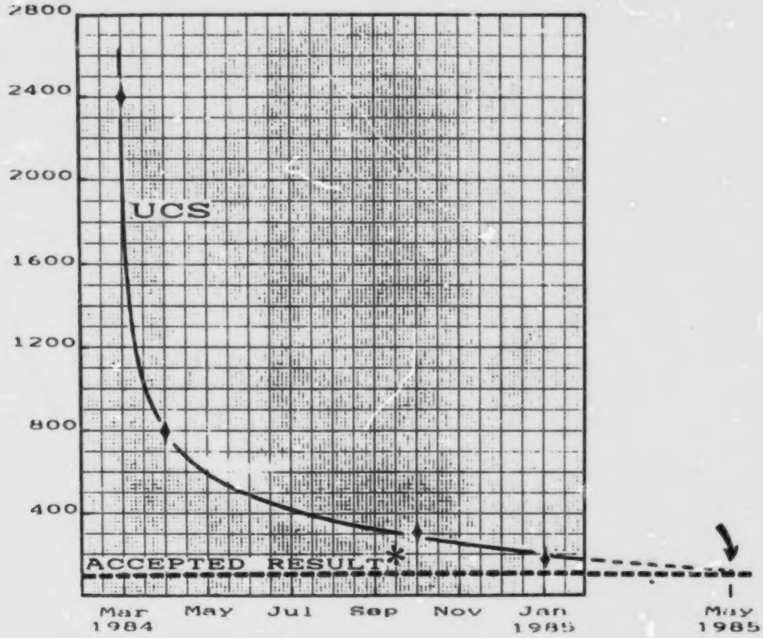
I think that in their zeal to get into the record a dissenting opinion, based, I believe, on the deep conviction that a defense against missiles is profoundly destabilizing, these highly competent scientists have not checked their work with the care they would address to journal publications.

I have a chart that relates to the history of the calculations by spokesmen for the Union of Concerned Scientists on the famous question of satellite constellation sizes.

It is important to realize when you look at this chart that the conditions underlying all these calculations are the same. Dr. Garwin mentioned he thinks they are unrealistic.

NUMBER OF SATELLITES NEEDED FOR DEFENSE

History of UCS Estimates



*Los Alamos
Rand
General Research
Livermore

N.B. These are different answers obtained by UCS theorists over the course of time to the same problem.

The chart's interest lies in the fact it shows the declining curve, precipitously declining at first, of the Union of Concerned Scientists' estimate, addressing one particular problem, and that problem has not changed. It is roughtly the same throughout the history shown on this graph.

It is the problem of a standard laser and a standard set of satellite attitudes and the question of how many satellites are needed. It goes over by now the well-known fact that the first estimate by UCS is 2,400 of these satellites at $1 billion apiece, that is, $2½ trillion, which makes the President's proposal for missile defense a turkey as the UCS called it.

A month later in testimony to this body, that number was reduced to 800.

In a Scientific American article that came out in October of last year, 4 or 5 months later, it came down again to 300.

Then in a most recent discussion of this matter, the number for a similar calculation came down to 162. That is a 15-fold connection in 9 months. That is actually with a 0.5 second retarget time and should be reduced a bit for zero retarget time.

This curve is interesting because it is gradually coverging on the number known for years to the members of the community, and four of them are listed at the bottom of this graph—Los Alamos, Rand, General Research, and Livermore. The right number is about 100. The UCS curve and the accepted right intersect in May 1985.

The question is: How does this happen? Perhaps the calculation shown on this chart is not realistic, as Dr. Garwin said, but, nonetheless, it is the one that he chose to argue about with the defense science community.

After public attention was drawn to these large errors in the UCS estimate of satellite constellations, the Union of Concerned Scientists decided number of satellites are unimportant and countermeasures are really what matters, although when they first came out with their report quoting "thousands" of satellites they gave a very prominent place to that number, on page 2 of their report. The countermeasures came later.

I would say that one really must address with great care the suggestions by the UCS about the efficacy of Soviet countermeasures against our defense when they come from the same source that have shown themselves to be capable of errors like this.

PREPARED STATEMENT

I close only with the thought that it may be necessary to put more reliance on the full-time defense professionals than we have in the past for advice on this matter.

[The statement of Mr. Jastrow follows:]

PREPARED STATEMENT OF PROFESSOR ROBERT JASTROW

DARTMOUTH COLLEGE
HANOVER. NEW HAMPSHIRE

The proposal to conduct research into methods of defending the United States from a Soviet nuclear attack seems to me to be very sensible. Some of my scientific colleagues, however, have been critical of this proposal. They point out that nuclear weapons are very destructive, and no defense can be 100 percent effective -- at least, not against a massive attack involving thousands of warheads. Therefore, they say, a defense against Soviet missiles cannot protect the American people from the threat of nuclear destruction.

However, further thought reveals that this reasoning is not valid. I could not do better than to give the explanation for the flaw in the reasoning that was provided last year by Henry Kissinger, the self-styled "architect" of the ABM treaty. Dr. Kissinger writes,

> "I was less than enthusiastic about President Reagan's 'Star Wars' speech when I first read it ... Even a 90 percent effective defense would still let enough weapcns through to to destroy an unacceptable proportion of our population.
>
> "As I reflected, that argument struck me as more and more superficial.
>
> "Even granting -- as I do -- that a perfect defense of our population is almost certainly unattainable, the existence of some defense means that the attacker must plan on saturating it.

"This massively complicates the attacker's calculations. Anything that magnifies doubt inspires hesitation and adds to deterrence."

Dr. Brzezinski has expressed similar views: "Strategic defense ... can increasingly complicate the planning and execution of an effective first strike ... restoring the element of deterrence simply by creating again greater uncertainty ..."

It is possible to put quantitative teeth into the reasoning put forward by Drs. Kissinger and Brzezinski. Suppose our defense is 80 percent effective -- a very conservative estimate, according to defense experts. That means we can shoot down four out of five Soviet warheads in a mass attack. With such a defense in place the Soviets will know that the bulk of our nuclear missile forces will survive their attack. They will know that if they attack us, we will be able to strike back with out nuclear weapons and reduce all the major Soviet cities to rubble in thirty minutes.

The Soviets will know this, and they will not attack us if we have an 80 percent defense against their missiles, or even a 60 or 70 percent defense. Our defense need only be good enough to guarantee the survival of most of our retaliatory forces -- the key missile silos, Trident submarine pens, air bases -- and, most important of all, the chain of command, beginning with the President, that would actually order a nuclear counterattack against the Soviet Union.

Such a defense, preserving the destructive power of our nuclear arsenal, will virtually foreclose the option of a first strike by the Soviet leaders. Its deployment will serve notice on the Soviet leadership that it cannot hope to decapitate our political and military command and eliminate or greatly reduce our power of nuclear retaliation. In these circumstances, a nuclear first strike by the Soviet Union will necessarily seem to Soviet leaders to be a suicidal act. In the Soviet calculus of gains and losses from military action, the potential losses from such an attack are bound to outweigh any conceivable gain.

But, some of my scientist friends say (as well as other critics of the Strategic Defense Initiative) that means we are only protecting missile silos, not the American people. This is a false dichotomy, because any defense that discourages the Soviet leadership from an attack will add to the protection of the American people. But how much will it add to their protection? Here is what Dr. James Fletcher, who headed the Defense Technologies StudyTeam, had to say about that, in an article in the National Academy of Sciences Journal, Issues in Science and Technology. Dr. Fletcher said it was clear to him, as a result of his panel's study, that a two-layer system -- of the general sort envisaged in my article with Drs. Brzezinski and Ambassador Kampelman in the New York Times -- could be effective enough "to protect most -- perhaps even 90 or 99 percent -- of the nation's population and infrastructure ... against a full-scale nuclear attack."

Note that Dr. Fletcher did not say "missile silos"; he said "population and infrastructure."

Dr. Fletcher went on to say that a complete three- or four-layer defense of the kind that, he said, could be deployed incrementally beginning in the 1990s, would have the potential of "protecting nearly all of the population -- perhaps even greater than 99 percent ... against nuclear attacks." That would be a defense so close to perfection as to blur the difference.

I spoke with Dr. Fletcher in January and asked him whether anything had happened to make him change his mind. He told me this statement remained his best judgment and he stood by it.

The question then remains as to whether such a defense will be cost-effective. That is, can the Soviets overwhelm our defense at less cost to them than the cost to us of building it?

Soviet leaders have threatened to do this. A Soviet spokesman said a little while ago that if the U.S. puts up a shield against Soviet missiles, then the Soviet Union "will do its best to get a sharper and heavier sword." In other words, the USSR will build more missiles in an effort to overwhelm our defense. The result will be an acceleration of the arms race, and more nuclear weapons in the world.

But some thought and calculation indicate that this Soviet threat is empty. Suppose the United States puts up a two-layer defense using smart bullets --a relatively mature and unexotic technology. And suppose that this defense can shoot down -- as an extremely conservative estimate -- 80 percent, or four-fifths, of the Soviet missiles and warheads in a mass attack. That defense is not a nebulous possibility; it depends on technologies that already exist, and it could be in place today if we had started to work on it five years ago. Suppose now that the Soviets decided they wanted to build enough missiles and warheads so that the number getting through our two-layer defense would be the same as the number that would have reached the United States if we had no defense. This is what "ovewhelming the defense" means. Now, the Soviets have 1400 missile silos and missiles that could be launched in a nuclear first strike against the United States. To overwhelm our defense, they would have to launch five times as many as they now have, or 7000 missiles.

But to get their arsenal of missiles up to 7000, the Soviet Union will have to build an additional 5600 missiles. The USSR

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spent approximately half a trillion dollars in the last 20 years on building the 1400 land-based missiles it now has. To add 5600 more missiles -- four times as many -- to its arsenal would cost it 4 x $500 billion or $2 trillion more. The Soviet Union would be very hard pressed to spend another $2 trillion on missiles in the next five or six years, on top of its present military outlays.

Ambassador Nitze has said we must look at the question in another way. What is the ratio of marginal costs? For each extra dollar we spend on our defense, how many dollars will the Soviet Union have to spend on countering that dollar's worth.

The point here is that if we put our defenses in place incrementally, and it costs the Soviets less money to counter each addition to our defense than it costs us to build that addition, they win; they can outbuild us. But if their "marginal cost" is greater -- if it costs them, say $2 to counter our defense for every dollar we spend on making that defense better, then we win, because if they try to outbuild us, they will go bankrupt before we do.

This question of marginal cost, or cost ratios, has been looked at by experts in the Department of Defense and scientists at Los Alamos and Livermore. The Los Alamos team found that for the kind of defense envisaged as the second layer of our two-layer smart-bullet defense -- that is, the defense that intercepts Soviet warheads in the final stages of their flight as they descend towards their targets -- the ratio of costs favors our defense over their offense by at least three to one. In other words, if the Soviets want to overwhelm our defense, they must spend three dollars on adding missiles and warheads, for every dollar we spend on making our defense better. With a ratio like that, they would find it exceedingly costly to accelerate the arms race by building more missiles, as they have threatened to do.

What about the marginal costs for the first layer of the defense -- the so-called space-based or satellite layer? If this space-based defense is of the off-the-shelf variety, using smart bullets, the satellites in the American defensive screen will cost approximately half a billion dollars each. One of these satellites can destroy, on the average, 14 Soviet SS-18 missiles. The Soviet missiles cost, very conservatively, $100 million each, or $1.4 billion for 14. Comparing this to the cost of our satellite, the ratio of costs favors the American defense over the Soviet offense by about three to one -- the same as the ratio of costs for the first layer of the defense.

So the bottom line is that whether we look at the lump-sum expenditures for the initial reaction to a defense, or at the marginal costs, the ratio of costs heavily favors the defense over the offense. This would be true for the Soviet response to an American "Star Wars" defense, or the American reaction to a Soviet "Star Wars" defense.

No development could be more favorable to the cause of ending the nuclear arms race and eliminating nuclear weapons from the world. For the meaning of these results is that if both the U.S. and USSR put a defense against missiles in place, neither country will be able to overwhelm the other's defense by building more missiles, and both nations must then recognize the futility of a continued competition in the building of offensive weapons of mass destruction.

Of course, we have not built this defense yet; the basic technology of the hit-to-kill kinetic energy weapon -- unlike the laser or the neutral particle beam -- is fairly mature, but we have not assembled and tested the whole system. Still, the technology seems to be very promising, and the cost ratio, as far as it can be worked out at this stage, is also very favorable.

Furthermore, the American people want this defense. According to a poll sponsored by an educational foundation with which I am associated, 90 percent of the American people want their government to defend them from Soviet nuclear attacks. In fact, 74 percent, according to the same poll, believe we should be spending as much as, or more than, the amount requested for research into a defense against Soviet missile attacks in the FY86 budget.

With the people of the United States so strongly in favor of research on missile defenses, and the technical prospects for this defense promising, why are some of my scientific colleagues so hostile to this program?

That question interested me as a theoretical physicist, because the reason still given by these eminent scientists for their opposition is that an effective defense against missiles is not technically feasible.

It is true that only a handful of physicists with full clearances for SDI (I know of only four) hold this view whereas Drs. Fletcher and Keyworth, General Abrahamson and his staff, and hundreds -- more likely thousands -- of highly competent scientists and engineers at Livermore, Los Alamos, and other defense laboratories, all believe the program is sound.

Nonetheless there is a seeming paradox in this disagreement, for competent scientists stand on both sides. The resolution of that paradox is important for Congress and for the people, who rely on the scientific community for expert advice on technical matters relating to the defense of the United States against nuclear attacks.

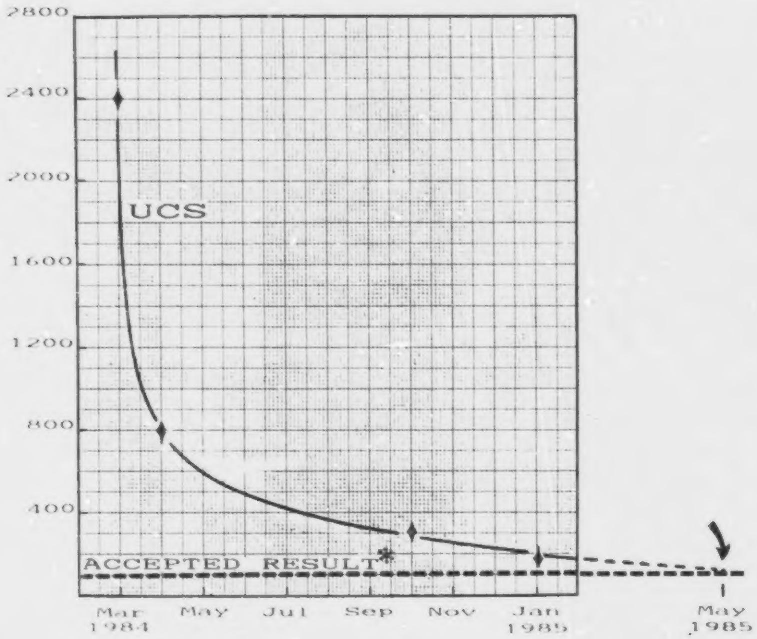
I have studied the technical issues and talked with individuals in the defense scientific community for much of the past year, and I have come to the conclusion that it may be difficult for a person who spends only a part of his time on these complex matters -- taking time off from teaching, research and administration -- to do as sound a job on the technical analysis as the individuals who are spending full time on the problem, have full computational support, and are backed by hundreds, or thousands, of colleagues.

I think that in their zeal to get into the record a dissenting opinion -- based, I believe, on the deep conviction that a defense against missiles is profoundly destabilizing -- these highly competent scientists have not checked their work with adequate care. I have said elsewhere that the work they have done in the last year or so in this area is shoddy. Perhaps that is too unkind. But I have also said that their work is grievously flawed by major errors of fact and reasoning.

I will give an example: A calculation of the number of satellites required to defend the United States against a massive Soviet attack. Many groups have studied this matter, basing their work on a common set of assumptions. The chart shows that estimates given for this number of satellites by spokesmen for the Union of Concerned Scientists have dropped from 2400 -- submitted in testimony to a Congressional committee in March 1984 -- to 162 in the most recent report distributed by a member of this group. Professionals working full time on this problem have known for some time what the correct answer to the question is. It is about 100 satellites. The declining curve of the Union of Concerned Scientists estimates seem to be converging towards that accepted answer and will intercept it in May 1985.

NUMBER OF SATELLITES NEEDED FOR DEFENSE

History of UCS Estimates



*Los Alamos
Rand
General Research
Livermore

These laser satellites are the big-ticket item in SDI. They cost about a billion dollars each. With that in mind, the difference between the original Union of Concerned Scientists estimate and the accepted result is the difference betwen a bill to the taxpayer of $2.4 trillion vs. $100 billion. The first number makes the plan a "turkey," as the Union of Concerned Scientists called it. The second number makes SDI a practical research program and well worth pursuing.

Spokesmen for the Union of Concerned Scientists say these satellite numbers do not matter; they say their work on countermeasures is what counts. But when the Union of Concerned Scientists report on missile defense came out a year ago, the reference to the need for "thousands" of satellites was given a very prominent place in that report, on page 2, and countermeasures came later. Only after public attention was drawn to these large errors in the estimates of satellite numbers, did the Union of Concerned Scientists decide that the number of satellites was unimportant and countermeasures really mattered.

It is difficult to see how their calculations on the efficiency of Soviet countermeasures can be accepted, when their calculations on the number of satellites required for our defense have dropped by a factor of 15 over a nine-month period.

ROBERT JASTROW

Appointments:	Lecturer in Physics, Columbia University, 1944-1947 Instructor in Physics, Cooper Union, 1947-1948 Postdoctoral Fellow, Leiden University, Leiden, Netherlands, 1948-1949 Member, Institute for Advanced Study, Princeton, New Jersey, 1949-1950, 1953 Research Associate, University of California, 1950-1953 Assistant Professor of Physics, Yale University, New Haven, Conn., 1953-1954 Consultant, U. S. Naval Research Laboratory, Washington, D. C., 1954-1958 Chief, Theoretical Division, National Aeronautics and Space Administration, 1958-1961 Chairman, Lunar Exploration Working Group, NASA, 1959-1961 Director, Goddard Institute for Space Studies, New York, NASA, 1961-1981 Professor of Natural Science, Teachers College, Columbia University, 1973-1975 Professor of Astronomy and Geology, Columbia University, 1961-1982 Professor of Earth Science, Dartmouth College, 1974 -
Societies:	Fellow of the American Physical Society, American Astronomical Society, AAAS, American Geophysical Union, American Meteorological Society, and the Leakey Foundation.
Member:	Council on Foreign Relations
Clubs:	Century, Cosmos, Explorers
Honors:	Medal for Excellence, Columbia University, 1962 Flemming Award to Outstanding Young Men in Federal Service, 1965

Graduate Faculties Alumni Award, Columbia University, 1967
Medal for Exceptional Scientific Achievement, NASA, 1968
Doctor of Science (Hon), Manhattan College, 1980

Books: EXPLORATION OF SPACE (editor), MacMillan, New York, 1960

ORIGIN OF THE SOLAR SYSTEM (co-editor with A.G.W. Cameron), Academic Press, New York (1963)

THE VENUS ATMOSPHERE (co-editor with S. I. Rasool, Gordon and Breach (1967)

UNTIL THE SUN DIES, W. W. Norton & Co. (1977)

GOD AND THE ASTRONOMERS, W. W. Norton & Co. (1978)

RED GIANTS AND WHITE DWARFS: THE EVOLUTION OF STARS, PLANETS AND LIFE, Harper & Row (2nd Edition, 1979)

THE ENCHANTED LOOM, Simon & Schuster (1981)

ASTRONOMY: FUNDAMENTALS AND FRONTIERS (with Malcolm Thompson), John Wiley & Sons (Fourth Edition, 1984)

THE ESSENTIAL DARWIN (with Kenneth Korey), Little, Brown (1984)

HOW TO MAKE NUCLEAR WEAPONS OBSOLETE, Little, Brown & Company, 1985

QUESTIONS SUBMITTED TO PROFESSOR JASTROW

ANSWERS TO SENATOR PROXIMIRE'S QUESTIONS

Q-1: THE IMPRESSION I GOT FROM THE NEW YORK TIMES MAGAZINE ARTICLE YOU CO-AUTHORED WITH DR. BRZEZINSKI AND AMBASSADOR KAMPELMAN IS THAT NUCLEAR DETERRENCE HAS WORKED FINE IN THE PAST BUT IS FAILING US NOW.

IS THAT CORRECT? IS NUCLEAR DETERRENCE FAILING US NOW? IS THAT WHY WE SHOULD DEVELOP A STAR WARS MISSILE DEFENSE SYSTEM? HAS THE REAGAN NUCLEAR BUILDUP STILL LEFT US WITH A FAILURE IN NUCLEAR DETERRENCE?

A: I believe deterrence by the threat of retaliation has been effective up to the present time but there are signs of erosion of the U.S. position in this regard. Our ballistic-missile submarines are the principal U.S. deterrent at the present time, but their invulnerability is compromised by research into methods of detecting submerged submarines, as well as by such developments as the recent Walker spy case. At some point in the 1990s we may find ourselves in a very perilous position as a result of these developments.

The Reagan strategic modernization program has been valuable -- especially in restoring the B-1B bomber which, unlike the B-52, has a fair chance of penetrating Soviet air defenses -- but the best deterrent, in my view, would be a combination of an effective force of nuclear retaliation and a defense that would prevent the Soviet Union from destroying the bulk of that retaliatory force in a surprise blow.

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Q-2: YOUR ARTICLE MENTIONS THAT EVEN A POINT DEFENSE OF OUR MISSILE SILOS "WOULD BE SUFFICIENT TO RESTORE MUCH OF THE CREDIBILITY OF OUR LAND-BASED DETERRENT." I THOUGHT THE SCOWCROFT PANEL, IN JUSTIFYING THE PLACEMENT OF MX MISSILES IN MINUTEMAN SILOS, SAID WE DO NOT FACE A WINDOW OF VULNERABILITY AS WE ONCE THOUGHT. ARE YOU SAYING THAT THE PANEL WAS WRONG AND THE MXs WOULD BE VULNERABLE IN MINUTEMAN SILOS?

A: I believe the Scowcroft report has been widely misquoted on the matter of the "window of vulnerability." The report states on page (4), "...the Soviets nevertheless now probably possess the necessary combination of ICBM numbers, reliability, accuracy, and warhead yield to destroy almost all the 1047 U.S. ICBM silos, using only a portion of their own ICBM force." It is true that the deterrent rests also on our other forces, in particular the ballistic-missile submarines. But the Scowcroft panel made it clear that in its judgment, the window of vulnerability for ICBMs is real.

The implication is indeed that MXs would be vulnerable in Minutemen silos. However, as General Vessey stated a few years ago (NY Times, May 6, 1983), "The Soviets have no guarantee that we would ride out their attack." In other words, they may find empty MX silos. Since the MX is the only missile we have with the accuracy needed to threaten super-hardened Soviet targets of high value to the Soviet state, it is an extremely valuable addition to our deterrent. I do not regard it at all as a bargaining chip, although it has been viewed mainly in that light in the recent debate.

Q-3: PROPONENTS OF STAR WARS HAVE SAID STAR WARS IS WHAT GOT THE SOVIETS TO THE BARGAINING TABLE. IF THAT'S THE CASE, DO YOU THINK STAR WARS SHOULD BE A BARGAINING CHIP AT GENEVA? OR, SHOULD WE PROCEED WITH STAR WARS NO MATTER WHAT THE SOVIETS DO?

A: It seems to me that "Star Wars," or the defense against Soviet missiles, is too important a matter to be put on the table as a bargaining chip. According to Dr. Fletcher, the Soviets are working as hard as they can on their own "Star Wars" effort and "it is unlikely they could accelerate their effort more than they have whatever we do." Faced with the prospect in the 1990s of a world in which the Soviets have a massive first-strike arsenal of more than 6000 accurate warheads, and also have an effective defense against our retaliatory blow, we must, it seems to me, proceed with our "Star Wars" program or enter into a very perilous period.

The debate over "Star Wars" is carried on in the United States as if it were up to us to decide whether there will be a "Star Wars" defense. But that is not the case. The options available to the United States for the 1990s are either a world in which the Soviets have an effective missile defense and we have none, or a world in which both nations have such a defense.

Q-4: DR. JASTROW, WHERE DID YOU GET THE FIGURE $60 BILLION FOR DEPLOYING SDI. NO ONE WITHIN DoD HAS CITED A FIGURE AS LOW AS $60 BILLION. THE COMMON JUDGMENT IS THAT AT A MINIMUM SDI WOULD COST HUNDREDS OF BILLIONS OF DOLLARS.

A: A figure of several hundrd billion dollars for SDI, as indicated in the question, is a sound estimate for the cost of the advanced three- or four-layer defense recommended by the Fletcher panel, possibly using lasers or particle beams, which might be in place by the lates 1990s or the turn of the century.

The $60 billion estimate in our article is for the cost of a simpler, two-layer defense using the existing technology of the "smart bullet" that could be deployed in the early 1990s with the existing technology of the "smart bullet". This is a ball-park figure. I obtained it from sources in SDIO when Dr. Brzezinski wrote to me to ask whether a defense of this kind would be feasible in the near term. Later, when we incorporated that material in the article for the N. Y. Times Magazine, I checked the cost estimate of $60 billion again with my sources. They in turn went through their systems analysis again reported back that they were reliable.

Although the DoD has not gone on the record regarding the cost of an early two-layer defense (or the advanced defense), when our New York Times article came out, the DoD put out a press guidance which said, that the specific technologies described in our article "are plausible possibilities which are among those under consideration" and the cost estimates in our article "are reasonable ball-park figures."

Q-5: MR. JASTROW. YOU SAY YOU HAVE CONSULTED WITH PEOPLE AT LOS ALAMOS ABOUT SOVIET CAPABILITY TO DEPLOY FAST-BURN BOOSTERS. HAVE YOU CONSULTED WITH THE SANDIA LAB?

IF YOU DID YOU WOULD DISCOVER THAT THEY ARE NOT AS PESSIMISTIC ABOUT THE SOVIET CAPABILITY TO DEPLOY FAST-BURN BOOSTERS.

HISTORY HAS SHOWN THAT WE HAVE TRADITIONALLY UNDERESTIMATED SOVIET CAPABILITIES. THEIR ABILITY TO CATCH UP WITH OUR MIRV TECHNOLOGY IS THE BEST EXAMPLE.

A: Regarding fast-burn boosters, some spots of optimism can be found in the defense community regarding the feasibility of an early Soviet deployment of this type of missile. However, when I consulted Dr. Fletcher about the matter, he gave me an estimate of the time required for the Soviets to deploy such a booster that agrees with General Abrahamson's estimate of the early twenty-first century.

Dr. Fletcher's estimate does not agree at all with Dr. Garwin's statement that the Soviets could deploy a fast-burn missile force in six years from the word go. Dr. Fletcher notes that we started development of the MX in 1972 and are still testing it 13 years later. According to Dr. Fletcher the consensus of the experts on this matter is that Soviet deployment of a fast-burn booster could take 15 to 20 years. He notes also that the Soviets took 10 to 15 years to build a modern missile force after the Cuban missile crisis. I have included his remarks as an insert to my statement before the Committee.

Dr. Fletcher played a prominent role in the development of TITAN and MINUTEMAN and General Abrahamson was program manager for the MAVERICK and the SHUTTLE. I believe the experience of these two individuals shows they are knowledgeable on missile engineering and their judgments on the time scale for development of a fast-burn booster can be accepted as reliable.

Regarding the tendency to underestimate Soviet capabilities, the situation in this instance is not that the missile experts think we could deploy a fast-burn booster far more quickly than the Soviets, but rather that neither power could meet this

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formidable technical challenge in the time scale envisaged by Dr. Garwin.

ANSWERS TO SENATOR BYRD'S QUESTIONS

Q-1(a): AT WHAT POINT DO YOU THINK THE UNITED STATES WILL BE ABLE TO SCALE DOWN ITS OFFENSIVE CAPABILITY?

A: Ambassador Nitze's proposed timetable seems reasonable to me. He has stated that in the next 10 years we will continue to rely on offensive weapons as our deterrent while "seeking a radical reduction in the number and power of offensive and defensive weapons". He went on to say that at this time "we should also be looking forward to a period of transition beginning 10 years from now, to effective non-nuclear defense forces. This period should lead to the eventual elimination of nuclear arms. A nuclear-free world is an ultimate objective." In other words, maintenance of our present offensive capability threat for about 10 years while we pursue "Star Wars" research and move toward deployment of a limited defense system. Then, in concert with the Soviets, carefully phased, simultaneous deployment of fully effective defenses on both sides, leading to a world in which the nuclear weapon is useless and its disappearance can be expected.

Q-1(b): WHAT CAN THE U.S. DO NOW TO CONVINCE THE SOVIETS THAT OUR ULTIMATE GOAL IS TO PHASE DOWN OFFENSIVE WEAPONS SO THAT THEY WILL NOT RESPOND TO THE SDI PROGRAM BY INCREASING THEIR OWN OFFENSIVE FORCES?

A: The Soviet threat to build up its nuclear arsenal in response to SDI is in my view an empty threat. The present Soviet ICBM arsenal costs roughly $500 billion. If we have, as a conservative estimate, a defense that is 80 percent effective, the Soviets must build up their force to five times its current size in order to overwhelm our defense, i.e., in order to get as many warheads through our defense and onto their targets as would have gotten through if we had no defense.

That would be an expenditure of $2.5 trillion in the next 10 years on top of the already heavy military budget.

Q-2: YOU HAVE STATED THAT A TWO-TIERED DEFENSIVE SYSTEM COULD BE AVAILABLE BY THE EARLY 1990s FOR ABOUT $60 BILLION. IF THIS IS TRUE, WHY ISN'T THE WHITE HOUSE PURSUING THAT COURSE INSTEAD OF REQUESTING MORE THAN $30 BILLION OVER SIX YEARS FOR RESEARCH ALONE? COULDN'T WE INVEST IN JUST YOUR TWO-TIERED SYSTEM AND THEN WORRY LATER ABOUT THE PENTAGON'S PROPOSAL FOR THREE- OR FOUR-LAYERED DEFENSE WHEN THE BUDGET SITUATION HAS IMPROVED?

A: If we build a two-layer system -- using unexotic, off-the-shelf technology and at a cost of about $60 billion for deployment in the early 1990s -- such a defense will, in my view, greatly strengthen our deterrent to a Soviet first strike. If we do nothing more than that, and leave this limited defense in place for 10, 20, or 30 or more years, the Soviets probably will, if they are given all that time, eventually figure out an effective countermeasure to this limited "smart bullet" level of defense technology. We must carry out the research on the more advanced and potentially more effective defenses, using three or four layers and with more than 99 percent effectiveness, to keep one step ahead of the Soviet offensive technologies and countermeasures.

National Institute for Public Policy

STATEMENT OF MR. COLIN S. GRAY, PRESIDENT, NATIONAL INSTITUTE FOR PUBLIC POLICY

LAST MOVE THEORY

Senator **Rudman**. Dr. Gray.

Mr. **Gray**. I am Dr. Colin Gray from the National Institute of Public Policy.

Most of the policy and strategy and arms control points raised in the first panel were covered preemptively in my prepared statement which will be in the committee's record of this hearing.

What I would like to do is offer a few comments, maybe five or six, on points of particular concern raised by the first panel and then perhaps just to summarize some of the more important arguments in my prepared statement.

Dr. Richard Garwin made reference to what we may term the so-called fallacy of the last move about the SDI. Those of us who are generically in favor of strategic defense allegedly are saying that somehow the strategic arms race could be terminated or severely arrested by development of strategic defenses.

There will not be a last move. I would like to assure Dr. Garwin and this committee that those who favor SDI generically do not hold to any notion there is a last move in the technological arms race.

As long as there is political fuel between Moscow and Washington driving the antagonism, the military competition between these two great nations, the technological contest will continue.

PROBLEM OF POLITICS

Those of us who favor SDI are not saying that somehow through the SDI we can abolish the competition, that we will reach a stable plateau, with the last move being deployment of strategic defense.

If we effect transition to defense dominance in the strategic postures of both sides to the competition, there will always be a danger of offensive breakout from such a plateau condition.

The problem is politics, political; the problem is not, in essence, technological. The danger has a technological expression. That which may do us in as a society in an afternoon is the technological expression of hostility in Soviet nuclear weapons and their delivery systems and, of course, the political incentive to use these weapons behind that technology.

We do not know how to address the political problem, we do not know how to achieve a general political settlement with the Soviet Union, but we do have more than a glimmer of hope and idea of how we get at the technological expression of that political antagonism.

SDI OFFERS POTENTIAL FOR SAFER EXISTENCE

The SDI is about our trying to live more safely in a nuclear age that we cannot abolish. SDI is not an attempt to abolish nuclear age; it is to live more safely.

The point is made by Dr. Garwin that the ABM Treaty of 1972 allegedly abolished or prevented an offense-defense arms race.

To the extent that that is true I suggest to this committee it is of relatively little comfort to us because what we have had since 1972, on the Soviet side, substantially is a very intensive offense-defense arms race. Indeed, behind much of the support of the ABM Treaty in the early 1970's was a fallacious theory of what drives the arms race—allegedly the Soviets' fear of what American defenses might be would drive the quantitative and qualitative movement in their program. Given what the Soviets have done in their offensive forces' program, it has been quite apparent that the notion of Soviet fear of American defense driving their offense is unfounded. The historical evidence is not there to support it.

Gerard Smith said that the United States today is preparing the ground for treaty breakout. Based on the knowledge I have of what the United States is about, what it says, and what planning is being done, that is not the case. There is no planning and there is no preparing the ground for breakout from the ABM Treaty at this time.

SDI EFFECT ON ABM TREATY

The point is also made by Gerard Smith that the SDI was conceived more or less on the basis that the ABM Treaty will be set aside. That remains to be seen. It depends on the cost effectiveness of the systems that are evolved and on the survivability of the systems as Paul Nitze has said in his Philadelphia address.

At the present time the SDI is not proceeding on the basis that the ABM Treaty will be set aside. We do not know. For the next 5, 6 or 7 years we are proceeding to explore technological possibilities to see if there is an overwhelming case for setting aside the ABM Treaty in consultation with the Soviet Union, should the technical and strategic story be supportive of such a development.

SOVIET REACTION TO SDI

Dr. Garvin raised the specter of 100,000 Soviet strategic warheads by the year 2000, roughly a factor of 10 increase from where the Soviet strategic inventory is today. I suppose all things are possible. If we are in a realm of picking big round numbers, why not 100,000, why not 200,000?

As far as I know, there is no authority for such a number. I find the notion that the Soviets are likely to engage in such a brute force response to SDI possiblities extremely unlikely.

Senator RUDMAN. Did you say that was unlikely?

Mr. GRAY. I said extremely unlikely.

The opportunity cost of doing that would be prohibitive, bearing in mind not only warheads, but delivery vehicles also. For the better part of 10 years the Soviet Union is not going to know what character of United States defensive architecture they are going to be facing.

The role of the defense planner in the late 1980's is an unenviable one, trying to decide how to optimize his response to SDI architecture that has yet to be chosen. I suspect that prominent among the Soviet responses to evolving SDI developments and even archtecture will be extensive development and, in due course, probably procurement of strategic defense.

I think they will discover they derive more military mileage, more suitable for the accomplishment of their objectives, through deploying a greater scale of defense than by just multiplying strategic offensive forces with the warm production lines that they have today.

Let me move rapidly into the summarizing of a few points in my paper, Mr. Chairman.

CHARGES AGAINST SDI

What I have done in my paper is to take what I regard as the 13 principal charges that have been leveled in the past several years and today against the Strategic Defense Initiative. What people believe it to be and what they believe it might be.

I have organized my paper as a series of favorable brief responses to these broad charges. The charges pertain to affordability, character and purpose, consequences, stability and the like.

The first charge, very familiar to us, is that the SDI is suffering from a very severe lack of coherence in its explanation. The administration, allegedly, doesn't know what it is about, where it is going, or why it is going there.

I reply to this by saying that the SDI is an initiative to explore that defensive technologies may be able to do, necessarily it cannot be tied to the rationale of a single military mission at this point in time.

It is not evidence of policy incoherence in 1985 to say both that there is a long-term possibility that strategic defense may render long-range bombardment by missile and aircraft as obsolete as the cavalry charge, and that in the shorter term defenses of a technically more modest character could serve exceedingly useful limited purposes.

In other words, we could have a shorter term and a longer term story and there is considerable compatibility between the two. There is no evidence of incoherence or divergent objectives in saying that we have a short-term and long-term vision.

FIRST STRIKE VERSUS SECOND STRIKE

Second, there is a whole cluster of charges in the realm of stability and the dangers to peace that lurk, allegedly, in the SDI and in transition to heavy defense deployments. The charge reads that the existence of strategic defense will create new incentives to strike first in time of crisis—crisis instability.

This is the crown jewel of the strategy against the SDI. I view this charge of crisis instability as what I would like to call a "mad systems analyst's" view of the world.

As a matter of narrow defense analysis, it should be true that a first strike would fare better than a second strike against defenses. The argument proceeds to claim that the Soviet Union would choose to begin a central war rather than risk being caught by a United States strike and having to retaliate with damaged and uncoordinated forces against intact United States defenses.

This charge neglects to explain: (a) Why the Soviet Union would anticipate any gain from "going first" in a crisis—even if they should do better going first rather than second; that is, why would they expect to do well enough? (b) Why United States defenses sufficiently serious as, allegedly, to motivate a Soviet first strike, would not also be sufficiently serious as to compromise Soviet expectations of military success.

In summary, I believe that SDI weaponization, far from imperilling crisis stability, will help stengthen existing disincentive to strike first.

Even at an early stage of deployment, SDI weapon architecture cannot help but raise critical new uncertainties in Soviet minds over their ability to strike reliably and in a timely fashion against United States strategic C-^{3}I assets and strategic retaliatory forces.

As the military incentive to strike diminshes—with the prospects for military success—so must the political incentive.

Bearing in mind the likely circumstances of an acute international crisis, with both sides' strategic forces being in a status of generated alert, a weaponized SDI would provide a very useful hedge against accidental or unauthorized strategic action by any party.

SDI CONSEQUENCES TO ARMS COMPETITION

With regard to consequences for the arms competition, the arms race between East and West, we are told that the strategic defense initiative must fuel a more complex defense-offense spiral of arms race activity, thereby creating new tensions and not providing enhanced security.

There really is no technological escape from the arms race and no proponent of the SDI would try to pretend for 1 minute that there is.

Anything the United States elects to do which challenges the military integrity of Soviet war plans is a candidate for a Soviet response. There is nothing uniquely stimulating of an arms race response about the SDI.

The Soviet Union will attempt to target United States SSBN's, mobile ICBM's, superhard silos, if we go that route, and to detect, track, and kill Stealth air-breathing strike forces.

What is so different about threatening the military efficacy of Soviet missiles with active defense, as contrasted with agile mobile ICBM and SLBM deployment, prompt launch on confirmation of attack, or protection by concrete and steel?

The problem is the Soviets' will to compete; it is not with the mode, active defense in this case, of the United States challenge to Soviet strategy.

The SDI is likely to dampen the race in offensive strategic arms if, and only if, defensive technologies render offensive forces increasingly unreliable military instruments.

It seems to me that the SDI offers the only feasible path to a transformation in the technical and strategic terms of the arms competition away from weapons lethal to people toward weapons that are lethal to the weapons that imperil our civilization.

Whether or not the United States will succeed with the technology exploration remains to be seen.

SDI EFFECT ON ABM TREATY

A great deal has been said about the ABM Treaty, the arms control process, and the allegedly harmful impact of strategic defense possibilities on the arms control purposes of the treaty.

SDI, we are told, poses a potential fatal complication for the arms control process and in the medium term it places at risk the integrity of the ABM Treaty. There is no denying the fact that the SDI is providing an important set of complications for the design of arms control policies today. I would prefer to view those complications rather as opportunities.

Critics of the SDI tend to forget that the SALT/START/INF process either failed or was in acute crisis long before President Reagan made his speech on March 3, 1983. The structural problem of East-West arms control is not the SDI—when you consider the status of that process, where it was, from 1979 to 1983.

In considering that SDI may provide new complications as well as new opportunities for arms control, it is well to remember that people on the left as well as on the right have been talking about crisis and failure in the arms control process for many years. If there is a crisis for arms control, it has not been created by the SDI.

The problem of the SDI for arms control does not reside with the United States SDI; rather, it lurks with the expected Soviet attempt to discourage the West from pursuing this new approach to stability.

VALUE OF SDI TO ARMS CONTROL

Far from being incompatible with arms control, I believe the SDI is the only instrument capable of triggering a disarmament regime of substantial benefit to stability. Deep reductions in nuclear arms are of little relevance to peace and security if the forces permitted can be lethal against military targets and if those forces are very large in absolute terms.

Very briefly, there is a familiar charge of people claiming that the SDI is unnecessary.

Senator **Rudman**. Doctor, I wonder if I might ask you to put your entire statement in the record. I don't want to cut you off, because your testimony is very vital and important. Unfortunately, people have dropped off here. I am running up against some schedule conflicts of my own, not having expected to chair this hearing this morning, but to participate.

If you would like to summarize whatever key points you wish, please do. If you can wind up in a few moments, I would appreciate it.

Mr. **Gray**. I will be pleased to do that.

People argue that the SDI is unnecessary. Of course, the problem for American security at root is political, it is the possible incentive that the Soviet Union may see to use its weapons, but as I said earlier, the expression of that Soviet hostility is in military technology concerning which we can do something.

ALTERNATIVES TO SDI

If you do not like many aspects of the SDI, I argue there is no alternative. The alternatives to the SDI, I suggest, are substantially trivial arms control accords which will be unequally complied with, as we have seen over the past 10 years, and will be the offensive dominant arms race with its attendant instability—very dangerous should deterrence fail—which we have today.

To say there are no good alternatives to SDI is not to say SDI must succeed, but it is to say there is a context for discussion of the SDI and that political context says there really are no very plausible alternative theories, or possibilities of alternative routes, for very considerable improvement in our security in the foreseeable future.

Certainly, very radical schemes for offensive force disarmament could never succeed in the absence of very heavily deployed defenses because the side that can hide a handful of weapons would have won.

SDI COSTS

I might make a point on the question of cost. Some large round numbers, dollarwise, have been thrown around. In letters to the Wall Street Journal in the past several months you can find generic critics of the SDI talking about a range of several hundred billion dollars to $1 trillion dollars.

There is no authority for the R&D and procurement cost of a multilayered SDI over a 20- or 30-year period.

I would like to remind the committee that if one takes a big round number like $500 billion, a noticeable chunk of change, you can frighten an audience, frighten an American taxpayer with a number like that.

On the other hand, we are talking about a process of expenditure over a 20- or 30-year period.

Also, you can't talk cost effectiveness just talking about cost. We are talking about a three-, four- or five-tiered, multilayered SDI that would do more than just protect missile silos. It would provide substantial protection to American society and would provide the only technically convincing answer to the theoretical nuclear winter danger.

The price of protecting North America against all save a handful of weapons might turn out to be on the order of perhaps $500 billion, maybe 8 percent of the defense budget over a 20-year period.

If we spread the acquisition cost over a 30-year period, obviously the percentage goes down. There should be a very favorable response if you were to put to the American people the possibility of our having a 4- or 5-tiered architecture of defense, that isn't going to be perfect, but that would change our situation from being at certain risk to 20,000 or 30,000 Soviet warheads, to our being at risk only to an uncertain minute fraction of that range.

We may be able to buy that threat reduction and all that goes with it by way of deterrent benefits, support of overseas allies, and I can give a whole list of other SDI benefits in strategic terms, at a cost on the order of a half trillion dollars over 20 or 30 years. That is roughly 8 percent or less of the defense budget.

I suspect the American people would view that as the bargain of the century. There is too much throwing around of big round numbers that somehow have to be spent in a 2- or 3-year period.

When you think of the cost of SDI contrasted with the cost of major tactical air programs, and bearing in mind the length of time I am talking about, I suggest the dollar cost would be affordable.

If the technical story bears out, the deterrent benefits and actual defense benefits if deterrence every fails, provide us with the argument of overwhelming moral and political obligation on the part of the White House to proceed to see if the SDI is feasible.

I don't believe that the White House really has any responsible choice other than to see if there is some way of our escaping from being totally at risk to whatever scale of nuclear threat Soviet or other leaders may choose to target against us.

I believe the cost will be affordable. Certainly I endorse Paul Nitze's view that if the SDI is not cost effective, we should not do it and if space platforms are not survivable, we should not deploy them.

[The statement of Mr. Gray follows:]

NATIONAL INSTITUTE FOR PUBLIC POLICY

PREPARED STATEMENT OF COLIN S. GRAY

SDI POLICY ISSUES

I would like to thank the Committee for this opportunity to speak on the policy issues of the SDI.

Two years after President Reagan's historic announcement on March 23, 1983 of what was to become the Strategic Defense Initiative (SDI), it is important to take stock of the policy debate that has evolved. In order to provide a sharp focus for the discussion, my statement is organized as answers to thirteen charges that currently are being levelled at the SDI.

Issue (1): The Character and Purpose of the SDI

Charge: The SDI has been explained in different ways by different officials -- there is a lack of coherence in the policy rationale.

Answer: The SDI, as an initiative to explore what defensive technologies may be able to do, necessarily cannot be tied to the rationale of a single military mission at this time. It is not evidence of policy incoherence to say both that there is a long-term possibility that strategic defenses may render long-range bombardment by missile and aircraft as obsolete as the cavalry charge, and that in the shorter term defenses of a technically more modest character could serve exceedingly useful limited purposes.

It is perfectly consistent to say (a) that one day strategic defense may transform the terms of deterrence essentially so as to exclude nuclear threats, and (b) that during a possibly lengthy transition period from today to such a condition of defense,* strategic defenses could, indeed should, greatly strengthen the stability of nuclear deterrence as we know it now.

Issue (2): Stability in Time of Crisis

Charge: The existence of strategic defenses will create new incentives to strike first in a crisis.

Answer: This is the "mad systems analysts'" view of the world. As a matter of narrow defense analysis, it should be true that a first strike would fare better than a second strike against defenses. The argument proceeds to claim that the Soviet Union would choose to begin a central war rather than risk being caught by a U.S. first strike and having to retaliate with damaged and uncoordinated forces against intact U.S. defenses.

This charge neglects to explain: (a) why the Soviet Union would anticipate any gain from "going first" in a crisis -- even if they should do "better" going first rather than second (i.e., why would they expect to do well enough?); (b) why U.S. defenses sufficiently serious as, allegedly, to motivate a Soviet first strike, would not also be sufficiently serious as to compromise Soviet expectations of military "success."

It is worth noting that the people who level this charge tend also to be the people who claim that the SDI will be a great technical fiasco. They would have us believe that the SDI, at one and the same time, will be technically incompetent and a major threat to stability!

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* Defense dominance may be defined as a condition wherein the contemporary relation of relative advantage between offense and defense is reversed.

SDI weaponization, far from imperilling crisis stability, will help strengthen existing disincentives to strike first. Even at an early stage of deployment, SDI weapon architecture cannot help but raise critical new uncertainties in Soviet minds over their ability to strike reliably ad in a timely fashion against U.S. strategic C^3I assets and strategic retaliatory forces. As the military incentive to strike diminishes -- with the prospects for military success -- so must the political incentive.

It is important that the Soviet Union not be the first to deploy nation-wide BMD, in addition to their air and civil defense programs. Soviet official attitudes towards "acceptable damage" may be dangerously different from American attitudes. The tough new Soviet leadership could come to believe that a new BMD addition to their posture would give them a new potential for intimidation.

Bearing in mind the likely circumstances of an acute international crisis, with both sides' strategic forces being in a status of generated alert, a weaponized SDI would provide a very useful hedge against accidental or unauthorized strategic action by any party.

Issue (3): Stability and the Arms Race

Charge: The SDI will fuel a more complex defense-offense "spiral" of arms race activity, creating new tensions and not providing any enhancement in security.

Answer: There is no technological escape from the arms race. The arms race is on today, substantially -- though far from exclusively -- in the offense-offense realm. Anything the U.S. elects to do which challenges the military integrity of Soviet war plans is a candidate for a Soviet response. There is nothing uniquely stimulating of an arms race response about the SDI. The Soviet Union will attempt to target U.S. SSBN's, mobile ICBM's, superhard silos (if we go that route), and to detect, track, and kill "stealthy" air-breathing strike forces. (Too many American critics of the SDI choose to ignore the cultural asymmetries between the U.S.S.R. and the USA: See Colin S. Gray, *Nuclear Strategy and National Style* [University Press of America, 1984]).

What is so different about threatening the military efficacy of Soviet missiles with active defense, as contrasted with agile mobile deployment, prompt launch on confirmation of attack, or protection by concrete and steel? *The problem* is the Soviet will to compete, it is *not* with the mode (active defense, in this case) of the U.S. challenge to Soviet strategy.

To claim, sensibly, that the Soviet Union will attempt to "race" with the SDI, offensively and defensively, is really a trivially obvious point -- it is not a criticism (though many critics seem not to understand that). The superpowers are in a dynamic arms competition today. Prominent among the U.S. policy motives behind the SDI is a determination to shift some of the terms of the competition away from the accumulation of ever-more lethal offensive forces.

The SDI is likely to dampen the race in offensive strategic arms, *if*, *and only if*, defensive technologies render offensive forces increasingly unreliable military instruments. The SDI offers the only possible path to a transformation in the technical and strategic terms of the arms competition away from weapons lethal to people Whether or not the U.S. will succeed remains to be seen: this is what the SDI is all about.

Issue (4): *Arms Control and the ABM Treaty*

Charge: The SDI poses a potentially fatal complication for the arms control process today, while in the medium term it places at risk the integrity of the ABM Treaty.

Answer: There is no denying that the SDI is providing an important set of complications for the design of arms control policy today. However, those "complications" could better be stated as opportunities. SDI critics tend to forget that the SALT/START/INF process either "failed" or was in acute "crisis" long before President Reagan made his speech on March 23, 1983.

The "problem" of the SDI for arms control today does not reside with the U.D. SDI, rather does it lurk in the (expected) Soviet attempt to discourage the West from pursuing this new approach to stability. Far from being incompatible with arms control, the SDI is the only instrument capable of triggering a disarmament régime of substantial benefit to stability.

"Deep reductions" in nuclear arms are of little relevance to peace and security if: (a) the forces permitted can be lethal against military targets; and (b) those forces are still very large in absolute terms. The SDI could: (a) defend retaliatory forces and essential C^3I; (b) discourage further accumulation/improvement of offensive forces; and (c) "police" a truly deep-reductions régime (by neutralizing the military/political value of treaty non-compliance -- even on a large scale).

If the Soviet Union should come to fear a combination of effective U.S. offensive and defensive forces, it should discern a most pressing set of reasons to negotiate sharp cut backs in offensive arsenals.

Issue (5): Alternatives to the SDI

Charge: The SDI is unnecessary.

Answer: No one is suggesting that, somehow, the nuclear age can be repealed. But if one believes it may be possible to effect reductions on such a scale in the size -- or effectiveness in action -- of nuclear arsenals that Western society no longer need be at terminal risk, then it is difficult to discern any plausible alternatives to strategic defense.

To sustain the charge that the SDI is unnecessary one would need to argue that "there is a better way." It should not be forgotten that the SDI looks both to strengthen deterrence and, if needs be, to provide physical protection. Since there are no paths available, at present, towards the transformation of the basic character of world politics, this charge has to rest upon the proposition that an offense-dominated deterrence will never fail or be irrelevant.

The case for the SDI, in the context of this charge, is (a) that it should lead to a more effective deterrent of war, and (b) that it would be the only reliable way in which damage in war could be limited very severely. The SDI carries the promise of strengthening the pre-launch survivability of offensive forces during the early stages of a "defensive transition," all the while providing more and more persuasive reasons for the Soviet Union to restructure its strategic forces away from offensive elements (because they will not "work") over the long run.

There are problems with strategic stability in an offense-dominated world -- and strategic defense looks to be a cost-effective solution to many of those problems. While, in the longer term, although SDI cannot alter the character of Soviet-American security relations, it certainly may be able to alter the burden of risk to society, indeed to the entire planet, that is inseparable from "the balance of terror."

Issue (6): The Technical Feasibility of the SDI

Charge: Whether or not strategic defense is desirable is beside the point, the SDI simply will not work.

Answer: The technical feasibility of the SDI remains to be demonstrated. No one is making extravagant claims -- save on the negative side. Military history is replete with examples of whole classes of weapons being rendered obsolete (or having their roles changed dramatically) by new technologies. There is no reason in principle why the long-range ballistic missile might not cease to be a useful weapon of war against a superpower.

The technical infeasibility charge needs to be interrogated closely as to its details. What is it that a weaponized SDI, allegedly, will be unable to do? (1) Protect retaliatory forces? (2) Provide vital minutes (at least) of survival time for C^3I assets? (3) Discourage the targeting of urban areas of no, or very minor, military importance? (4) Keep all nuclear weapons away from American society?

Some SDI critics are arguing that the offense always can restore a relation of advantage over the defense. This is poor military historical analysis. It is true that there has been a permanent dialectic between offense and defense -- meaning that one could as well argue that the defense always restores a relation of advantage -- but that dialectic reveals itself in different ways. There is nothing in history suggesting that an SDI ascendancy over offensive missiles need not be permanent, though history (and commonsense) does suggest that two states locked in a long-term competition will probably find new, or revive old, ways to hurt each other.

If one seeks ways to end the arms competition, one must look to political factors, not to technology.

Issue (7): The Cost of the SDI

Charge: The SDI is not affordable.

Answer: It is difficult to conduct cost-effectiveness analysis when the cost (of SDI weaponization) is not knowable at this time.

SDI critics hover in their cost preferences in the range "several hundred" billion-$1 trillion for SDI, R,D,T,E and procurement. These numbers are worthless -- except that they have a contemporary political impact that is not easy to counter. The proper starting point for analysis, if we grant the critics' premise of a multi-tiered (four or five) architecture of defense, is to say that for "X dollars" we should be guying the functional equivalent of (and perhaps the event itself) of near-total nuclear disarmament of the Soviet Union. For "X dollars," Americans would have bought effective immunity of American (at least) society from terminal (though certainly not all) nuclear danger. No other category of weapon, of any kind, can protect American society in this way. A weaponized SDI, multi-tiered, offers a unique quality and quantity of physical protection. What should Americans be willing to pay for that?

If, for the sake of argument (and only for the sake of argument), we take a figure of $500 billion as the full-up R,D,T,E, and procurement cost of a multi-tiered weaponized SDI, elementary arithmetic shows that the cost would be 8% of the defense budget for the next twenty years.* If a defensive transition is spread over thirty years, the burden is reduced, of course. No critic of the SDI is going to win a political argument claiming that 8% of the defense budget for twenty years is not "worth" the physical protection of North America!

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* Assuming a constant level of $300 billion per annum for the defense budget.

Issue (8): *The SDI and the "Fortress America"*

Charge: A protected America would retreat upon itself and the current structure of international security would collapse.

Answer: The logic in this charge is as bizarre as the claim is popular (abroad). It may be true that if U.S. strategic defenses trigger new Soviet strategic defenses, the Western Alliance will need to reconsider its strategy (as the terms of deterrence alter), but the connection between SDI weaponization and American isolationism is so elusive as to be analytically invisible.

A modest scale and character of SDI deployment in the 1990s would strengthen the contemporary terms of offense-dominated deterrence -- and thereby would help bolster the last line of NATO-European defense. More capable strategic defenses, designed to keep the vast majority of Soviet nuclear weapons away from American "targets" (of any kind), logically must help strengthen the long-standing U.S. role as principal security guardian of distant friends and allies. After all, it has been the vulnerability of North America to Soviet attack that has caused European leaders and theorists, *since the 1950s*, to question American reliability as security guarantor (would the U.S. risk New York for Hamburg?, etc).

If America returns to isolationism, it will be because it discerns an unwillingness on the part of allies to help in their own defense to an appropriate degree, *not* because the U.S. is newly defended by a weaponized SDI.

Issue (9): *The Soviet Response to the SDI*

Charge: The Soviet Union is willing and able to offset U.S.

strategic defense with new quantities and qualities of offensive forces.

Answer: There is no question but that the Soviet Union is strongly motivated to discourage the United States from pursuing open ended, all-purpose, strategic defense R and D, wheresoever it might proceed. Similarly, there can be no doubt that the Soviet Union is able to produce more offensive forces and upgrade the quality of new offensive weapons. However, Soviet defense planners can be trusted to be sensible in their allocation of scarce economic assets. A highly cost-effective SDI deployment, *the only kind the United States would field*, will not be met by an endless proliferation of Soviet offensive assets. Facing an exponential rise in the price of access to American "targets," Soviet defense planners will nave to recommend a fundamental change in policy (this has happened before -- until 1968-69, the Soviet Union favored heavy constraints on offensive forces and permitting defenses to run free).

Furthermore, a point frequently neglected, the Soviet Union's difficulties with the effectiveness of its offensive forces do not reside solely in the realm of (*potential*) problems with the SDI. Whether or not the U.S. SDI matures into a period of weaponization, Soviet planners have to be anxious that the days of confidence in *offensive counterforce* success may be passing swiftly. U.S. C^3I modernization means a much reduced prospect for a decapitation strike; prompt launch out, under or after attack, of MX and *Minuteman* may not be usefully targetable; and *Ohio* class SSBN;s pose an intractable ASW problem. All of these concerns, and more, should point to the conclusion (already signalled tentatively by Marshal Ogarkov) that *defensive counterforce* is more reliable a means of limiting damage than is *offensive* counterforce (which is not to suggest that the Soviet Union would choose one or the other exclusively).

When the Soviet Union comes to believe that the United States truly will stay the course with the SDI, its tactics should change towards arms race management. It is more likely than not that the Soviet Union will seek to negotiate a new strategic defensive arms treaty which permits deployment in technical areas where in Soviet competitive potential is good (terminal and late mid-course), and precludes deployment of a kind not reliably attainable by Soviet science-based industry (boost, post-boost, and perhaps mid-course defenses).

Issue (10): The SDI and a "Technological Peace"

Charge: Peace can only be political. The SDI is a futile attempt to provide an inappropriate technological solution to a political problem.

Answer: Peace is indeed political rather than technological. But, the military expression of an essentially political incentive to compete, or even fight, is no less essentially technological. The basic security problem for the United States is the assumed political incentive Soviet leaders might have some day to use their weapons. Given that no one, critic or proponent of the SDI, has any plausible theory today of how we proceed to effect a general and definitive political settlement with the Soviet Union, we have no choice other than to minimize those dangers to our security that can be minimized.

Soviet long-range missiles pose a technological threat to American survival. It is entirely appropriate that, pending the political evolution in a benign direction of U.S.-Soviet security relations, a technological answer be sought to that technological danger.

The SDI should enable us to deter war more reliably and even, if need be, survive a breakdown in the deterrence system. No responsible person is claiming that the SDI, itself, effectively resolves political problems. But, the SDI may enable us to live more safely with the political problems that continue to evade effective political treatment.

Issue (11): Offense and Defense in a Period of Transition

Charge: A period of "defensive transition" would be uniquely dangerous for stable deterrence.

Answer: The proper relationship between the offensive deterrent that the United States has today, and the defensive deterrent that it may have tomorrow, is indeed a challenge to sensible policy-making.

The key to maintaining stable deterrence is to ensure that at no point do Soviet military planners have a plausible theory of military victory. It is close to a certainty that both superpowers will want to maintain a substantial offensive arsenal, if and when they proceed to deploy new BMD weapons: (a) to "backstop" defensive deterrence; (b) to deter third parties; (c) "just in case....." However, as the U.S. Government says today, a point may, indeed should, come when deterrent duties vis à vis in the U.S.S.R. can be shifted from offensive to new defensive force elements.

It is important that there be no premature transfer of duties, from a deterrent that "is," to a deterrent that "may be." Furthermore, the U.S. SDI would be assisted very considerably were the Soviets to agree to a negotiated deep reductions régime in offensive nuclear arms. For the Soviet

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Union to be persuaded sooner rather than later to join in a cooperative, or at least partially cooperative, defensive transition, it is important not only that they give great technical credit to U.S. defenses, but also that they should be anxious concerning the ability of U.S. offensive forces to penetrate their defenses.

As the President has stated, it is not the U.S. intention to achieve a first-strike advantage. But, if a very useful disarmament régime is to be negotiable, it is probably essential that the Soviet Union anticipate an evolving future strategic balance increasingly to their military disadvantage. It will always be a unilateral possibility for the United States to downgrade the quantity, and even restrict the quality, of its offensive forces -- to moderate Soviet anxieties -- but Soviet anxieties, unfortunately, really are the engine of arms control progress.

Issue (12): The SDI and Western Alliance Cohesion

Charge: The SDI will promote a quality of political disunity within NATO that will more than offset whatever military security benefits it might confer.

Answer: The security condition of European allies is different from that of the United States, for the simple reason of geographical proximity to a wide range of Soviet threats. That is a fact of political life, and has long been recognized in the architecture of NATO's strategy of "flexible response" (MC-14/3 of 1967).

NATO-Europe recognizes that the key to its security is Soviet belief in the "coupling" of the USA with the security of Western Europe. In practice this means today, as it always has, that the United States has to be permitted to manage the

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military details of the central strategic relationship in ways that it finds tolerable.

The SDI opens the possibility of change in the terms of deterrence -- and the NATO-Europeans are suspicious of change. After all, they claim, the current situation is "good enough," is it not? NATO-Europe can see the legitimacy, indeed political necessity, for the United States to defend itself if it can -- as an *absolute* U.S. obligation to itself. U.S. allies, understandably, are concerned (a) lest a U.S. SDI prompt new Soviet defenses that degrade the deterrent value of Western offensive nuclear threats (in which even, "what deters?"); (b) lest a U.S. SDI is so expensive that the U.S. cuts back dramatically its general purpose force deployments in Europe; and (c) lest a defended America prompt a U.S. President to take more risks in foreign policy than Western Europe (vulnerable to Soviet tank armies) deems prudent.

If the U.S. does *not* pursue the SDI as critical to a credible first-use strategy, then *Soviet* defenses are likely to weaken the deterrent value of the upper echelon of the "NATO triad." Deterrence, in a heavily defended world (East and West) will be enforced by: (a) more effective conventional forces; (b) protected defense mobilization potential; (c) residual nuclear anxieties. It is worth emphasizing that a weaponized SDI could protect the NATO allies from nuclear or conventional missile/aircraft attack, and that such SDI protection could be critically significant in reducing Soviet military confidence *vis à vis* a conventional invasion.

Politically, and with reference to military strategy, NATO should come to appreciate the SDI as more of an opportunity for benign change than as a threat to a security system that works well enough.

Issue (13): Ethics and the SDI

Charge: There is no ethical case for the SDI.

Answer: Moral philosophy distinguishes between two kinds of argument: the absolute (or deonotological) and the consequentialist. The case for the SDI may be made with both kinds of argument.

In terms of the ethics of consequences, the SDI should provide a more robust deterrent against war, and -- should deterrence fail nonetheless -- should ensure that the least damage possible (in admittedly a very bad situation indeed) is suffered. In absolute terms, the SDI defends what and who can be defended. It can be argued that the U.S. Government has an absolute duty to provide protection to the American people. In addition, one can argue that to deter by threatening to defeat enemy weapons is absolutely morally superior to deterrence by the threat to damage enemy society (to e blunt: "killing people is wrong, and threatening to kill people is wrong" -- particularly if there is a better way available).

American society finds all aspects of nuclear weaponry morally repugnant. Moreover, there can be no offensive nuclear strategy "with a human face." U.S. deterrence strategy today, with its quite heavy reliance upon (latent) nuclear threat, is an affront to the values of our culture. It is probably not too strong to say that Western uneasiness with, and distaste for, the means of nuclear deterrence, dangerously undermines the goals of our policy.

In a speech on March 15, 1985, the British Foreign Secretary, Sir Geoffrey Howe, posed and answered the following questions:

> But can we afford even now simply to wait for the scientists and military experts to deliver their

> results [on the SDI] at some later stage? Have we a breathing space of five, ten, fifteen years before we need to address strategic concerns? I do not believe so. The history of weapons development and the strategic balance shows only too clearly that research into new weapons and study of their strategic implications must go hand in hand.

The study of the strategic policy implications of the SDI is proceeding with no less energy than is being expended upon the technical questions.

COLIN S. GRAY
PRESIDENT

Colin Gray is a strategist with a professional background in the study of U.S., Soviet, and NATO defense policies.

Born in 1943 in Oxfordshire, U.K., Dr. Gray studied at the Universities of Manchester and Oxford in the United Kingdom, and has taught at the Universities of Lancaster (U.K.), York (Canada), and British Columbia (Canada). He was a Ford Foundation Fellow at King's College, University of London, and an Assistant Director of the International Institute for Strategic Studies in London. From 1976-1981 Dr. Gray was a staff member, then Director of National Security Studies at Hudson Institute, Croton-on-Hudson, New York.

Dr. Gray's books include: *American Military Space Policy* (1983); *Strategic Studies and Public Policy: The American Experience* (1982); *Strategic Studies: A Critical Assessment* (1982); *The MX ICBM and National Security* (1981); *The Geopolitics of the Nuclear Era* (1977); *The Soviet-American Arms Race* (1976); and *Canadian Defense Priorities: A Question of Relevance* (1971). He has published articles in such journals as *Foreign Affairs*, *Foreign Policy*, *Bulletin of the Atomic Scientists*, *The Annals*, *Orbis*, *Survival*, and *International Defense Review*. He is a member of the editorial board of *Orbis*. He is a member of the General Advisary Committee on Arms Control of the U.S. Arms Control and Disarmament Agency.

Dr. Gray has lectured frequently at universities and military colleges and is an Adjunct Professor of National Security Studies at Georgetown University.

Dr. Gray's most recent books are *Missiles Against War: The ICBM Debate Today*, and *Nuclear Strategy and National Style* (to be published in September 1985). He is working on a major study of strategy in the Twentieth Century.

Dr. Gray became an American citizen in 1981.

NATIONAL INSTITUTE FOR PUBLIC POLICY

ANSWERS TO QUESTIONS FROM SENATORS:

BYRD, PROXMIRE and ANDREWS

From Colin Gray

Answers to Questions from Senator Byrd.

1.(a) The U.S. does not want to negotiate a treaty banning (defensive) "space weapons". The SDI R and D program is designed, *inter alia*, to explore the technical feasibility of such weapons. The U.S. probably would prefer a world wherein both superpowers had defensive space weapons to a world wherein neither did. If SDI R&D indicates that the technology for effective defensive weapons is feasible, the existence of a treaty banning defensive weapons would be unfortunate because such a treaty would support the wrong goals.

(b) The Geneva talks are likely to lead to useful agreements in the course of time, provided the Congress does not deny the Administration the visible and credible momentum in offensive force modernization (*all* 100 MX ICBMs), and SDI exploration, that is the "coin of the realm" of arms control bargaining. If Congress were to effect drastic cut-backs in U.S. offensive force modernization programs or SDI funding, particularly at this stage (with a President recently reelected by a landslide vote), the Soviets must be encouraged to believe that the U.S. itself will abort programs necessary for useful negotiations. The implications for Soviet arms control policy are all-too-obvious.

(c) The U.S. should not just withdraw from the ABM Treaty regime. However, it is time that those who debate publicly U.S. defense policy, showed some strategic maturity on the subject of the ABM Treaty. (1) The treaty was not "made in heaven" and it does not, necessarily, express or reflect eternal truths; (2) the Soviets already, legally and politically, have excused the U.S. from thoroughgoing treaty observance for reason of their treaty non-compliance ; (3) the Treaty reflects the aspiration of 1971-72, and most of those aspirations have not subsequently been fulfilled. The principal such aspiration, even expectation, was that strict limits on BMD would facilitate very effective permanent curbs on the counterforce potential of offensive forces -- this has not come to pass. I would recommend that we pursue the SDI in a treaty-compatible manner but that we not hesitate to look to the pursuit of defensive technologies as being an overriding national interest. As a matter of principle, the U.S. should not knowingly permit itself to be more treaty-constrained than is the U.S.S.R.

2. Unless we as a country are willing to pay the kind of entry price requested for support of the SDI program, we shall never find out whether a cost-effective BMD system is feasible. I believe that many opponents of SDI funding for FY 1986 at the $3.7 billion level, in truth are seeking to implement a "technological filibuster". SDI, by its very nature, lends itself to prospectively permanent R&D -- there will always be problems that more research, and/or more time, will clarify if not resolve. There is a "time and a tide" for a program like this.

Large cuts in SDI funding requests: (a) will deny us technical momentum; (b) will deny us political momentum that is critically important if our allies, and the U.S.S.R., are to believe that we really are serious; (c) would neglect the fact that the strategic problems the SDI is endeavoring to address are not matters of marginal interest -- they are, quite literally, issues of life and death (pertaining to our ability to deter in crisis and, if needs be, to survive in war). Given the recent establishment of SDIO, and the very high international visibility of the SDI program in the context of the renewal of the arms control process in Geneva, this would be an exception- ally poor time to effect large budgetary reductions. Since SDIO is only one year old, if the Congress views with favor the objectives of that Office it is difficult to see what grounds there could be, at this juncture, for drastic budgetary surgery (grounds pertaining to SDI, that is -- external considerations, such as deficit reduction, are, of course, another matter).

Answers to Questions from Senator Proxmire

1. The U.S. cannot expect the U.S.S.R. to cooperate in helping resolve, or alleviate its' (U.S.) defense problems. The key to preserving stability during a transition phase from offensive-dominance to a more balanced offense-defense posture (and perhaps to a defense-dominant force structure, one day) therefore cannot be Soviet cooperation unless that cooperation is in the Soviet interest. Instead, it is U.S. self-help in offensive-force modernization, and expeditious procurement of defense, so that the Soviet Union never believes that it is in a fleeting period of strategic opportunity. The U.S.S.R.

would be likely to enjoy a period of more substantial BMD deployment than the U.S., for reason of the on-going character of their BMD production. It is for this, among other, reasons that I have always sought to emphasize the need for the U.S. to maintain momentum in its strategic offensive-forces' modernization program -- "to quard the transition". As BMD capability comes "on line" it will help guard the offensive forces guard. If the U.S. were to choke off its offensive forces' programs -- perhaps on the grounds that "defense is coming" (eventually) -- while moving at all deliberate speed towards defensive deployment, then a transition period could be fraught with instability of a technical kind. It is well worth mentioning that "stability" cannot be understood solely with reference to the characteristics of military forces.

2. With reference to strategic forces, and the proper ways in which they should be analysed for their adequacy, or otherwise, the U.S. has not been engaged in a "build-up" at all. The adequacy of our strategic forces has to be assessed in the light of (a) the foreign policy support missions they are assigned; (b) Soviet strategic capabilities as a threat to the integrity of [(a)]; (c) alternative military capabilities. For U.S. defense capability overall, relative to Soviet efforts, the 1970's was, as President Reagan has said, a "decade of neglect". In a speech on August 20, 1980 at the U.S. Naval War College, then Secretary of Defense Harold Brown stated as follows: "Though we made some significant advances in the 1970's, especially in MIRVed warheads, our investment in strategic programs in that decade was less than one-third of what the Soviets spent on their strategic programs". The Soviet Union, through sustained and great effort, entered the 1980's with larger, far more modern, and in some ways more capable strategic forces than did we.

I am a defense analyst, not a "star wars enthusiast", and I disagree strongly with anyone who seeks to argue that the Reagan Administration's offensive-forces modernization program, thus far has been and prospectively will be "all for naught". The offensive forces comprise the deterrent that "is", defensive forces comprise a deterent that "may be". Strategic defense for "intermediate" objectives -- strategic forces, C^3I, logistic infrastructure, defense -- would complement the offensive forces' modernization program. In the longer term, a multi-layered, weaponized SDI may be able to provide a better deterrent through preponderant defense. Where the "star wars enthusiasts", to whom you allude in the question, are correct is in pointing out that while it is senssible to consider possible instabilities in a defensive transition, it is no less sensible to consider the instabilities that lurk in the offense-offense competition of today.

3. I assume that the U.S.S.R.: (a) will place very high priority upon developing countermeasures; and (b) that many of the potentially more troubling countermeasures will not be verifiable by us through NTM with any high degree of confidence. No arms control treaty is going to serve to deny the U.S.S.R. effective and feasible countermeasures to U.S. BMD. The U.S.S.R., on the record to date, has not permitted treaty language to constrain it from doing that which it found important, and in some cases just expedient, to do. I see no good reason why the Soviets would behave in a different manner in the future, particularly with regard to a mission as important as neutralizing U.S. strategic defenses.

Therefore, U.S. BMD has to be sustained, and sustainable, on its own competitive tactical and technical merits.

With "Red Team" analysis and intelligence information, U.S. SDI weapon and support system designers will have to keep "the state of the (defensive) art" ahead of "bad case" threats. Far-reaching arms control agreements are indeed likely, as the President has said, once the Soviet Union comes to believe that it faces military -- and hence political -- disadvantage as the alternative to such agreements. It is my assumption that the U.S.S.R. will do anything and everything they can afford that makes military sense given their "doctrine of war". The U.S. will not be able to *persuade* the U.S.S.R. not to develop, test and deploy countermeasures that would be cost-effective against our defenses -- also, we could not verify their absence in deployed forces, in many cases. The only solution to our problem is to design BMD systems in which we have very plausible grounds for placing our confidence. Much of the public discussion of countermeasures to SDI weaponization, to date, has been very facile.

4. No, I do not agree with him. There are *no* eternal truths about offense -- defense relationships -- and, even if there were, I am unaware of Dr. Delauer having any credentials as a military historian. Judgments on offense 'v' defense have to be specific to time, place, and economic, tactical and strategic circumstances. *In principle*, a defense can always be beaten by an offense willing and able to buy one more bullet so as to run the defense out of ammunition. If, as SDIO and Paul Nitze maintain, it is the U.S. intention to attempt to develop a BMD architecture that will be highly cost-effective, with "exchange ratios" dramatically favorable to the defense, then the cost to the U.S.S.R. of providing a truly "brute-force" reply by way of proliferation of weapons, is near-certain to be prohibitively high to Moscow.

Soviet staff officers are not known for favoring grotesquely inefficient allocations of scarce assets. In principle, *given long enough*, the Soviet Union might be able to produce the 100,000 strategic nuclear weapons to which Dr. Richard Garwin referred in the Hearing, but is it likely, given the apportunity costs, that the Soviet defense establishment would choose to purchase an arsenal in expectation of suffering 96 plus percent attrition? The rubles expended on the 90,000 *additional* weapons over today's deployed arsenal would be far more usefully devoted to other military missions (including strategic defense).

Nonetheless there is no doubt that the mission of U.S. strategic defense would be easier to accomplish were the scale and, if possible, the quality, of the Soviet offensive threat to be scaled back or arrested. The Soviet Union should agree to large-scale reductions in offensive forces (a) if they are convinced that the U.S. SDI will be technically successful; (b) if they believe that the U.S. political system will sustain the support essential for the SDI.

An SDI that can succeed in its assigned missions *only* in the context of arms control constraints on offensive forces, would be an SDI very unlikely ever to proceed beyond R and D.

5. Whatever one's chosen premise may be concerning the desirable relationship between offense and defense, it is plausible to assume that both superpowers will continue to work hard on defense penetration technologies. Unless the U.S. is on the technical frontier of BMD countermeasures, it will not know what the Soviets may know about that subject (by way of analogy, consider the roles of ASW research).

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As a student of history I believe that competition between offense and defense is endemic in military relationships and cannot be prohibited -- certainly not prohibited effectively -- by treaty. The President's vision of an orderly transfer of deterrence burdens from offense to defense is not at all incompatible with what I (and Keith Payne) have written in Foreign Affairs. Critical to the SDI is the proposition that defense may come to dominate offense because offense no longer will work reliably. Noone, to my knowledge, is presuming that work on offensive-forces R and D will cease -- there will always be the possibility of an "offensive transition" back to the situation as before. Arms control regimes and military postures, with some time lags, will always reflect what defense communities come to believe (rightly or wrongly) are military-technical realities. A defensive transition, even a condition of defense dominance, will be sustainable so long, and only so long, as it reflects military-technical facts.

There can be no technological "last move" in the arms competition. The "last move" in the competition will have to be political.

Answers to Questions by Senator Andrews

1. It is not U.S. policy to seek to contain Soviet strategic defensive developments, though certainly it is U.S. policy to deter additional Soviet BMD deployments ahead of the U.S. being ready with offensive and/or defensive programs suitable to offset any benefits the U.S.S.R. might receive from such deployment.

The new national security concept outlined by Paul Nitze for the overall guidance of our negotiators in Geneva, has the following features: (a) encouragement of

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a transfer of deterrence duties from offensive forces to defensive forces; (b) negotiation of reductions in offensive forces to a low level. Plainly it is the U.S. aspiration that the Soviet Union will come to see military-technical merit in reducing offensive forces in favor of defensive forces. This is not seen as a matter for doctrinal persuasion, but rather as a matter for Soviet technical recognition (that offensive forces will not work reliably for contingent performance of vital military missions).

It is possible that the U.S. and the U.S.S.R. could agree to phase-in defensive weapons, and phase-out offensive weapons, on an explicit schedule -- thereby fostering predictability and minimizing instabilities that might flow from "worst case" threat projections.

In general, the U.S., according to current policy at least, would prefer to pay a deterrence price in U.S. offensive forces unable to penetrate Soviet defenses with high confidence, in return for Soviet offensive forces scaled back and thereby contributing to the robustness of U.S. defenses. Soviet defenses are a threat to the U.S. and its allies only in the context of counterforce-capable Soviet offensive forces. U.S. strategic offensive modernization -- to help "guard" a defensive transition -- complemented with growing active defense, should provide very healthy insurance against dangerous instabilities and would encourage Moscow to negotiate seriously an agreed restructuring of strategic forces.

2. The conclusion is valid for as far as it goes -- but it does not go far enough. The European allies, to generalize, are concerned lest the SDI promote a change in the "terms of deterrence" that would be adverse for them. They are fearful that Soviet strategic defenses (and it is

Soviet, not U.S., defenses that are the problem) would place at a severe discount the nuclear escalation threat that runs close to the surface of NATO strategy. "If the Soviets no longer feared, or no longer feared anywhere near as much as in the past, suffering nuclear damage 'at home', what would deter them?" For more than thirty years the advent of bilateral nuclear deterrence has been held by some people -- including senior U.S. policy-makers -- to imply the need for adequate conventional defense in, or deployable to, the theater. NATO-Europe is not discontented with the current situation because: (a) current strategy, or something, has "worked" (ie. the Soviets have not attacked); (b) current strategy is relatively cheap; (c) current strategy is believed to maximize deterrence in that there are no very convincing-looking "thresholds" available between military contact in Central Europe and a superpower "central exchange". The dangers, even the incredibility, of current strategy, are not so much denied as ignored.

U.S. strategic forces are "the last line of deterrence" for NATO-Europe. If, as I believe, the SDI can strengthen deterrence in the medium term with fulfillment of relatively modest military missions, then NATO-Europe eventually will recognize the benefits of strategic defense. In the longer term, SDI weaponization, or more precisely its Soviet counterpart, should help drive NATO defense preparation in the direction that the Alliance says, today, that it favors -- specifically, towards a robust non-nuclear defense. The U.S. may understand why European allies would prefer not to pay for an adequate local conventional defense, but it should not be overly sympathetic.

It is important that our "European allies support the goals and developments of the SDI program". But just as

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we should be attentive to the possibility that American parochialism might lead us in policy directions that, on balance, were better resisted, so we should also be attentive to parochialism on the part of our allies. Sir Geoffrey Howe, among others, has raised important questions concerning the net effect for our security of the SDI and what the SDI might become. Those questions must be treated honestly and on their merits. The backcloth to this discussion has to be frank recognition of some geostrategic realities. The United States, for reason of geography, faces a far narrower band of plausible military threats to its security than do the European allies. Effective missile and air defenses would confer close to a sanctuary status upon North America -- Europeans, facing Soviet tank armies, would not be in such a secure condition. It follows that the SDI, because of strategic geography, inherently can do less for Western Europe than it can for the United States.

SOVIET RESPONSE TO SDI

Senator RUDMAN. Thank you very much.

I was fascinated, Dr. Gray, by your statement and I guess one of yours, Dr. Jastrow, relating to your thought that it would be extremely unlikely for the Soviets to respond with brute force an to SDI if it eventually became deployed.

Historically that is precisely how they did respond to what we started doing in the 1960's. I had a very chilling discussion with a very high-ranking Soviet military official in this country with the Chezvensko delegation approximately 8 weeks ago.

We got into a rather lively discussion on SDI. He was speaking through an interpreter although I think he understood English very well.

His statement simply was that faced with a deployment of this kind—of course, I am not saying this is the truth—this is what he said which seems logical to him—that their response, the quickest, cheapest, most effective response would be an enormous expansion and thus a violation, of course, of the treaty. Knowing full well, that this would be a violation of the treaty in their minds, of an existing land-based force and the construction of an enormous number of decoys.

Whether the number is 100,000 or 50,000, I don't know. But that is what they said.

Let us take them hypothetically at their word. Let us assume they do that and we have this layered defense in effect with the kind of numbers we are presently looking at with a 20,000- or 30,000-warhead capability of theirs that we are assuming and all of a sudden they go well beyond it. Where would we be then?

Mr. JASTROW. I think that threat is empty. The number put in the discussion today, 100,000 warheads is a tenfold increase in the present Soviet threat. It has cost them a half trillion dollars to put their present land-based force in place.

SOVIET STAR WARS R&D

I cannot see them spending $5 trillion in a paroxysm of reaction to our defense. What they would do is what they are already doing. They are working hard on their own star wars program. That means not only Smart Rocks and Galosh improvements, but laser defense, and these are Fletcher's words:

> It is unlikely they would accelerate their star wars effort whatever we do.

I would say there is an element of hypocrisy in the Soviet reaction you heard. The threat is empty purely on physical ground alone. How can they spend $5 trillion on top of their present budget?

Senator RUDMAN. I would answer that for you. They don't have a Senate Appropriations Committee to be concerned with. They don't have much public opinion that counts.

I dare say if the Soviet military planner felt it was absolutely essential to deploy 40,000 or 50,000 warheads and some number of decoys to beat the system in 1990 or 1991, I would not be surprised to see them do it.

I am saying we don't think we can slide over that one quite that easily.

Mr. JASTROW. I don't want to argue with you. Just one little thought.

In this country when it turns out a weapon system that is vulnerable, for example, suppose it turns out, 50 percent of the B-1B's can be destroyed. Do we build many B-1B's? Probably not.

Senator RUDMAN. I would submit you would have a heck of a time just getting 100 around here. That has a lot to do with strategic policy. It has to do with politics.

SUBCOMMITTEE RECESS

We have to conclude this hearing now. I wish to thank both panels for giving us excellent testimony which will be read and reviewed.

I will also say I have been to a lot of hearings. If it is possible to get cerebral indigestion, this hearing will cause it. Thank you.

[Whereupon, at 12:30 p.m., Monday, April 22, the subcommittee was recessed to reconvene at the call of the Chair.]

DEPARTMENT OF DEFENSE APPROPRIATIONS FOR FISCAL YEAR 1986

TUESDAY, JUNE 4, 1985

U.S. SENATE,
SUBCOMMITTEE OF THE COMMITTEE ON APPROPRIATIONS,
Washington, DC.

The subcommittee met at 10 a.m., in room SD-192, Dirksen Senate Office Building, Hon. Ted Stevens (chairman) presiding.

Present: Senators Stevens, D'Amato, Proxmire, Chiles, and Sasser; also present, Senator DeConcini.

NONDEPARTMENTAL WITNESSES

FORMER COMMANDER IN CHIEF, SOUTHERN COMMAND

STATEMENT OF GEN. PAUL F. GORMAN, U.S. ARMY (RETIRED) (FORMERLY COMMANDER IN CHIEF, U.S. SOUTHERN COMMAND)

OPENING STATEMENT OF SENATOR CHILES

Senator CHILES [presiding]. I will call the committee to order.

I will start off presiding for a few minutes this morning. Senator Stevens was called to the White House. He will be here about 10:30.

We are here today to discuss the cooperation by the Defense Department in the Government's increasing effort to interdict drug imports.

This subcommittee has been an ardent supporter of increasing the Defense Department's role in combating drug traffic. This is the third hearing by the subcommittee devoted to this subject during the past 2 years. It is clear the members of this subcommittee are committed to finding a means to help stem the tide of drugs into the United States.

In the past 2 years, this subcommittee has enhanced the Defense Department's efforts by recommending funding increases for the Navy to increase flying hours in support of drug interdiction and by directing the transfer of Army helicopters to the Customs Service to fight the war on drugs.

INTRODUCTION OF GENERAL GORMAN

We are holding this hearing today to ascertain what more the Defense Department can do to aid in combating drug traffic. The hearing was requested by me. I am delighted Senator Stevens has agreed to invite General Gorman to this special hearing.

Senator DeConcini and I heard General Gorman testify on March 15 in Miami on the same subject matter we are covering this morning. Frankly, we were so impressed with his insight on the drug interdiction problem and the role Southcom could play in the war on drugs we felt this subcommittee should have the benefit of his testimony.

One comment General Gorman made in Miami last March made a great impression on me. Essentially, the general said, for the same dollar of expenditure, Southcom, in cooperation with military establishments in the Andean republics of South America, could interdict 10 times the drugs as the same dollars spent by the civilian agents.

I want to begin by thanking Senator Stevens for agreeing to our request to hear General Gorman today. The subcommittee has been a tremendous help. In addition to the remarks I made earlier, the subcommittee has also helped in providing at one time additional moneys on two occasions:

Additional moneys for the Coast Guard that could be used in its role, a major part of which is interdiction of drugs.

And for additional ships for the Coast Guard, the committee has been helpful in that way.

General Gorman, you will be our lead witness today. If you have an opening statement, General, we will be happy to hear it. Your full statement will be included in the record.

OPENING REMARKS OF GENERAL GORMAN

General GORMAN. Thank you, sir.

I believe that the Defense Department did provide the committee a brief opening statement, but, if I may, I would like to summarize very succinctly the salient points therein.

First, it should be clear to you, sir, that I am now retired from service, having left the ranks of the active component on May 1. So, I will be speaking retrospectively. I have had no intelligence updates or other information later than March 2 on which to base my remarks today.

Nonetheless, I am convinced that the situation has changed little from what it was when we discussed it last in Miami.

DRUG TRAFFIC FROM LATIN AMERICA

You will recall, sir, that at that time I pointed out that Latin America is a peculiar problem for the United States with respect particularly to the importation illegally of marijuana and cocaine. South America also produces a significant part of the heroin illegally introduced into the United States.

These substance are attacking the very fiber of our society, our productivity, our ethics, our educational system and I believe they are attacking them more directly and dangerously than any other form of foreign subversion to which those institutions are subject.

I pointed out that the channels through which drugs and related personnel or materials are moved within Latin America and the Caribbean constitute a regional side, very well financed, transnational infrastructure.

This infrastructure is used to move other unlawful cargoes such as arms and munitions, personnel such as terrorists, spice, subversives, or criminals, and information such as political, economic, and military intelligence.

These activities generate vast funds and I believe that these funds are both economically wasteful and politically dangerous. They seldom underwrite any form of permanent development. They often spawn local crime and corruption and they frequently have been used to finance revolutionaries of the right or of the left determined to overthrow established government.

UNITED STATES STAKE IN SECURITY OF LATIN AMERICAN NATIONS

To the degree that the United States has taken a renewed interest in the democracies to our south and through such mechanisms as the Caribbean Basin Initiative and the Jackson plan committed large sums for their economic revival and economical well-being, we have a stake in their security against the threat posed by this drug trafficking.

Finally, I pointed out that drug traffickers reacting to pressure from lawful authorities in Latin America as well as to pressures from the United States have in many countries formed common cause with Marxists-Leninists, with anarchists, and with international terrorists.

The money, mobility, communications, transnational resources of the individuals or groups that traffic in narcotics have, therefore, lent a wholly new dimension to threats from insurgents or terrorists, and again where those threats imperil governments that we support, we have engaged interest.

ENORMOUS THREAT OF DRUG IMPORTATIONS INTO UNITED STATES

Now, in my previous statements on this matter I have argued that drug importing is a threat to the Nation of such a magnitude that it requires us to bring all our societal defenses, both law enforcement and military defenses, to bear.

I have argued that striking at drug importing at its sources is strategically more sound, more economical and more helpful to friendly democratic governments facing these parasites than relying on a strategy which I have characterized as a picket fence around our own borders.

Incidentally, sir, if I could amend slightly your characterizations of my remarks, my statement on the better way to spend dollars would be to invest them in helping governments to the South as opposed to putting money into military operations or exercises of the sort that we have been attempting in the Caribbean, using defense resources for the purposes, in effect, of enforcing the picket fence. I think that a multiplier of 10 is a reasonable estimate.

SUPPORT OF SOUTHCOM AGAINST NARCO TRAFFICKERS

I have not argued, in fact, I have argued against, tasking Southcom to do the job of any other agency of the Government, particularly civilian agencies. I do believe that it would be strategically useful to put U.S. Southcom in support of this campaign.

Finally, the most important thing that the Department of Defense could provide, and certainly Southcom would be uniquely in a position to provide, to other governments who are prepared to act against the Narco traffickers would be intelligence.

Again and again in discussing this problem with colleagues in the Ministries of Defense in Latin America, they pointed out that their fundamental deficiency, their fundamental shortcoming, was inadequate intelligence and they ask particularly that the United States help them.

Now, this has led me to advocate proffering security assistance to countries involved with drug phenomena, particularly the Andean republics, and I have further suggested that this security assistance could be conditioned on performance against drug production, processing, transportation, and management.

I believe that some modest expenditures over and above those that were contemplated in the administration's fiscal year 1986 foreign assistance budget would significantly assist in the Andean region in particular in bringing increased Government pressure and counteractions to bear on the producers of drugs.

When you can deal, sir, with drugs by the tons, you are in a much better position than having to deal with them in relatively small packets with which our law enforcement agents here in the United States frequently are called upon to cope.

With that, sir, I am open to your questions.

[The statement of General Gorman follows:]

PREPARED STATEMENT OF GEN. PAUL F. GORMAN, U.S. ARMY (RETIRED)

Mr. Chairman, my appearance before you today no doubt can be traced to the conversations I have held with some of you when I was in command of the United States southern command. As you may know, on 2 March I was succeeded in that position by General John Galvin. Therefore, I speak to you today historically, upon the basis not only of my 2 years of command in Latin America, but also from the prespective of the 40 years of military service which I will complete this year. Parenthetically, consistent with the policy of the U.S. Army, since this year I will both reach age 58 and finish 35 years of commissioned service. I will retire on or about 30 April.

These past few years have been a period of great change in Latin America, and I believe great change here in the United States with respect to our understanding and our attitudes toward Latin America.

Two years ago, in April of 1983, President Reagan, in an address to the Nation, outlined four basic objectives of U.S. policy in Latin America. I took these as my marching orders. He said at that time it is our purpose there to support democracy, reform, and human rights; that we are there to stimulate economic development; that we are there to support dialogue and negotiations; and we are there to support security as a shield for democratization, development, and diplomacy.

And I think that recent years have witnessed distinct progress toward all of those objectives. Concerning democracy, if you go back to 1979, two-thirds of the people in Latin America lived under military or military-dominated governments. Today, over 90 percent of the people in Latin America are living in countries with democratic governments. Since 1980 military juntas have turned back control of governments to civilians in eight countries, and since 1980, 15 countries in mainland Latin America have held free elections. El Salvador recently held its third national election in 12 months, and as I talk today, electoral compaigns are under way in Peru, Costa Rica, Honduras, and Guatemala.

Drug trafficking poses one of the main threats to this progress toward democracy and development. Drug traffickers stuborn politicians and corrupt legal systems, poison our diplomacy and threaten our security directly. We and the Latin democracies we support must find a better answer than we have thus far discovered to supressing this form of criminality.

My first official encounter with the modern drug culture came in Korea, in 1952, when I noted approvingly that an infantry unit occupying trenches along the floor of the Chorwon Valley below the Chinese-occupied Osang Mountain had developed extraordinary proficiency in concealing its positions with camouflage nets. But when I looked into it, I discovered that the troops were harvesting and drying marijuana as garnish on those nets, and that whatever security the concealment afforded, it was more than offset by the substantial loss of nocturnal alertness occasioned by canabis use in that outfit.

A decade later, as a long-range planner in the Army general staff, I read studies predicting that in the 60's and 70's, widespread use of mind-altering chemicals would be one of the factors fundamentally affecting national security, from the defense production base to front line units. Those forecasts turned out to be understated. In two tours of command in the Republic of Vietnam, and in every position I have held as a general officer since, I have had to deal with drugs as a pernicious influence on military personnel. Marijuana, heroin, and cocaine impact adversely personal professionalism, and divert the attention of unit commanders from their responsibilities for readiness to dealing with consequent in discipline, crime, and needless injury or death among relatively small numbers of abusers. I regard drug abuse, therefore as a national security problem.

But is drug importing a national security problem? I have testified before Congress repeatedly over the past two years that indeed it is. But I am aware that there is not unanimity in Washington on that subject. I am convinced, based on my experience, however, that the drug traffic from Latin America into the United States constitutes a threat to U.S. national security interests because:

First, Latin Americans produce and ship most of the marijuana and cocaine imported in the U.S., and a significant part of the heroin as well. These substances attack the fiber of our society—our productivity, our ethics, our education—more directly and dangerously than any other form of foreign subversion of which I can think.

Second, the channels through which drugs and related personnel or material are moved within Latin America and the Caribbean constitute a region-wide, well-financed, illegal, trans-national infrastructure. This infrastructure can be used to move other unlawful cargoes—such as arms and munitions—persons—such as terrorists, spies, subversives or criminals—and information—such as political, economic and military intelligence.

Third, the vast funds generated by these activities, are economically wasteful and politically dangerous. Even in the form of "laundered" funds, they seldom underwrite permanent development, often spawn local crime and corruption, and frequently have been used to finance revolutionaries of the right or left determined to overthrow established democracies. To the degree the U.S. has taken renewed interests in the democracies to our south, and through such mechanisms as the Caribbean Basin Initiative and the Jackson plan committed large sums for their economic revival and political well-being, we have a stake in their well-being, and in their security against the threat posed by drug trafficking.

Fourth, drug traffickers have reacted to pressure from lawful authorities in many countries by forming common cause with Marxist-Leninists, anarchists, and international terrorists. The money, mobility, communications, and trans-national resources of the narcotraficantes lend wholly new dimensions to threats from insurgentes or terroristas, and again where threats imperil democracies we support, our interests are engaged.

Those of you with whom I have previously spoken know that I have argued that these facts should have led the Department of Defense to task and resource the U.S. southern command to counter this genre of threat to U.S. national security interests. To a very modest degree, these arguments have been heard and acted upon. But I personally believe much more can and should be done.

Before I go any further, allow me to advance six premises or principles which I believe should guide U.S. policy in this respect.

(1) Drug importing is a threat to the nation of such a magnitude that it requires us to bring to bear all our societal defenses, both law enforcement and military.

(2) Helping our friends to strike against drug importing at its sources is strategically more sound, more economical, and more helpful to the democratic governments we support than is our continuing to rely on picketing U.S. borders.

(3) USSOUTHCOM should not be tasked or resourced to do any other U.S. agency's job. The objective is to put USSOUTHCOM in support of, not in charge of, the ongoing U.S. counter-narcotics campaign.

(4) Where drug trafficking prospers, the proponents of political violence profit, and arms flows and subversion are facilitated.

(5) The most important USSOUTHCOM contribution would be intelligence. From the viewpoint of the military intelligence collector, the problem gets involved with locating guerrillas are virtually identical to those with narcotraficantes. Broad area surveillance, pin-point localization, and real-time reporting are central to effective counteraction by a cooperating government against either threat.

(6) Security assistance, properly conditioned on performance against drug production, processing, transportation, and management, should be offered to democratic governments willing to commit their own military resources against the narcotraficantes. If thereby internal secuirty against subversion is strengthened, so much the better.

With these six postulates in mind, I recommend that this committee support:

A. Wiring USSOUTHCOM permanently and intimately into the flow of U.S. intelligence pertaining to drug-related activities in Latin America.

B. Tasking USSOUTHCOM to provide intelligence support to cooperating Governments.

C. Adding to the fiscal year 1986 foreign assistance authorization some $30 million for security assistance to Andean republics prepared to accept some assistance conditioned on counter-drug action by their military, provided, of course, that the USSOUTHCOM proposal for such an authorization, now being staffed in Defense, is approved and supported by the Secretary of Defense.

D. Augmenting the equipment, funding, and personnel authorizations of US-SOUTHCOM to effect the foregoing.

As I stated in my March 15 appearance before the House Committee on Government Operations in Miami, support of these recommendations would, for very little cost, greatly enhance the ability of USSOUTHCOM to assist the efforts of both U.S. agenices charged with counter-narcotics operations and friendly, democratic governments actively seeking to attack this mutual threat. The return on investment from providing intelligence and other support from USSOUTHCOM and security assistance to friendly Governments that focus indigenous military resources on counterdrug operations would exceed that harvested from extant drug interdiction efforts.

I would be pleased to answer your questions.

STATEMENT OF SENATOR DECONCINI

Senator CHILES. Thank you very much, General.

I am delighted that now we have been joined by Senator DeConcini and Senator Sasser. Senator DeConcini was with us in Miami when you testified down there on March 15. As I mentioned in my opening remarks, we were very impressed by your statement there.

Senator Sasser, along with other members of this subcommittee, has been very, very supportive of the roles that we have been attempting to play in trying to bolster our efforts.

Do you have an opening statement, Senator DeConcini?

Senator DECONCINI. Than you very much, Senator Chiles.

I want to thank Senator Stevens for holding this hearing as well as you, Senator Chiles.

General Gorman's attendance today is symbolic of the growing feeling that the Defense Department should become more active in the war on drugs. We appreciate what you have done to bring the problems to our attention and by offering solutions within the constitutional confines of the Posse Comitatus Act.

Furthermore, it is hard to deny there is a direct correlation between drugs, terrorism, subversion, weapon trafficking, and erosion of democratic forms of governments all around the world.

I know I am preaching to the choir when I tell you that we must accelerate our efforts to combat the drug smugglers. The fact that the President, the Secretary of Defense, and the Senate supported an amendment to the DOD authorization bill should send an unmistakable signal to the drug smugglers that the United States is finally ready by the creation of a reserve wing that can be used in peacetime for surveillance purposes. I think we have made a step forward.

General Gorman, your leadership in providing much needed military equipment and advice in this matter has been most influential. I think your testimony in Florida helped us fashion the wing and also your good advice and counsel as to what can be done with these foreign governments to attempts to influence their own efforts is most persuasive to me.

I thank you, General, for your willingness to kind of stick your neck out, but that is certainly the pattern of your career—saying it like it is. I think we are moving in a very constructive way.

Thank you, Mr. Chairman.

Senator Chiles. Senator Sasser.

Senator Sasser. I have no opening statement, Mr. Chairman.

SECURITY ASSISTANCE TO ANDEAN REPUBLICS

Senator Chiles. General, one of your recommendations was to add $30 million in fiscal year 1986 in the foreign assistance authorization bill for security assistance to the Andean republics prepared to accept come conditioned counter drug action by the military.

One controversial byproduct of such effort is that the military equipment then becomes available for use in domestic affairs in the various countries.

How could we ensure that the equipment is actually used to counter drug activity as opposed to internal police matters and how much of the $30 million for security assistance would be foreign military credits?

General Gorman. I don't think that we will have any guarantee, Senator, that any security assistance that we provide will not be abused beyond the normal trust and confidence which exists between us and the governments with whom we may be involved in these cooperative efforts.

I believe that those governments see themselves in a very serious predicament occasioned in part by the depredations of the drug traffickers. I accept at face value statements that have been made to me by leadership in the Andean republics that they honestly wish to do a better job against these traffickers.

Now, these forms of assistance that I would proposed under that $30 million would be correctly termed nonlethal. That is to say, they would be designed fundamentally to increase the capabilities of these forces to collect intelligence against the drug traffickers.

PROBLEMS OF SURVEILLANCE

The problem that these governments face is one of providing surveillance in areas where there is little or no government infrastructure at the present time, no police apparatus, generally speaking, not even the capability to conduct an adequate census of the population, let alone inserting forms of police control.

Obviously, we should do all that we can through our missions in these countries who might be the recipient of such aid to ensure that the employment of the material or the information that we may be providing them is used for the purposes for which it is intended.

I would opine that we do so with some considerable degree of confidence that it would not be abused by the recipient governments. Again, we are not talking here about guns or other material that could be used for police action as such.

EQUIPMENT NECESSARY FOR DRUG PROGRAMS

Senator CHILES. What kind of equipment would we be talking about?

Senator ANDREWS. Let us take, for example, the C-130 aircraft which are flown by most of the Air Forces in the Andean region. These aircraft are right now exclusively transport aircraft for the movement of freight.

With a modest amount of assistance from the United States they could be transformed into aircraft that would be capable of collecting intelligence over broad areas. The C-130 have the navigation capabilities, the range, and other flight characteristics that would permit them to operate.

Senator CHILES. So, we could put a radar package in?

General GORMAN. Radar package, cameras, other material with that kind of assistance.

Now, with respect to your question as to whether it should be credit or grant, most of these nations are in serious difficulties with existing debt and would be reluctant, I believe, most of them, to incur new debt, but I believe that that is something that you should put to the Department of State to work out with the recipient countries.

Whether grants or credit, however, we ought to condition whatever we provide heavily on its being directed to those who are acting against the Government.

Senator CHILES. In the package that Senator DeConcini was talking about in the Defense authorization bill, 2 of the 16 C-130's would be dedicated to Southcom.

You are talking about the equipment that we would give, the C-130's that are now in the Andean countries; is that correct.

General GORMAN. That is correct. Most of them have acquired C-130's in previous years, they are flying. It would be a relatively simple matter to convert those airframes into instruments that would be directly relevant to the intelligence gap that they believe they have.

EQUIPMENT AVAILABLE TO SOUTHCOM

Senator CHILES. You also talked about the suggestion for additional equipment and personnel being made available to Southcom for these activities.

Specifically, what kind of equipment and how many additional people would be required to implement programs that you are talking about?

General GORMAN. Again, the most useful sort of assistance that the United States could provide would be intelligence. Even being able to provide better weather information to the local forces would be a fundamental step forward.

Without going off into a discussion that I believe properly should be classified, I would say, generally speaking, that our strength is an imagery collection and analysis and signals intelligence collection and analysis.

If we could devote additional resources to those, I believe that we would be put thereby in a position better to advise, inform and direct the local governments in their search.

What we would do, in effect, is help analyze the broad phenomenon and focus their attention on specific areas which they with their own assets would then follow up, localize the problem and then proceed.

Senator CHILES. I think you told me certain officials in some of the countries have said if we should provide this intelligence to them, they would take care of trying to see that they stopped the planes or traffickers, or whatever else.

General GORMAN. Yes, sir. In country after country, both among civilian officials and senior military officers, I have received assurances that if they knew how or where these people were operating, they would take appropriate action against them.

I think you are aware, sir, that there have been instances in which, with clues from the United States, these governments have, in fact, so acted and done so to great good effect.

One strike in Colombia in March 1984 netted an amount of cocaine equal to a third of the annual consumption here in the United States in a single raid. It is that sort of phenomena that we ought to be searching for.

Based on the information at my disposal, I am prepared to believe that the Narco traffickers are still operating these large processing centers out in the Amazon wasteland, particularly near where Ecuador, Colombia, and Brazil come together, and that being able to get at those production centers, those places where the cocoa paste is brought in for processing into the crystalline form or other attempts at large-scale chemical alteration of the substances is undertaken is a very economical way to attack the movement of cocaine into the United States.

Senator CHILES. I am going to yield to Senator DeConcini for questions.

Senator DECONCINI. Thank you, Mr. Chairman.

ACTIONS BY CUSTOMS SERVICE

General Gorman, the Customs Service has had some outstanding success which they have reported to us in detecting drug traffickers with the present P-3 aircraft that is equipped with the F-15 combat radar.

However, under the DOD reserve squadron amendment which was passed the week before last here on the Senate floor, the selection of the airborne radar platform would be left to the Pentagon. It appears that the Air Force is recommending the C-130 for the mission with the F-15.

What are your views regarding the comparison of these two aircraft and can they both meet the mission as well as the ones that would be assigned to Southcom for that particular mission?

General **Gorman**. The first point, of course, is that what is significant is the radar. The whole object of the exercise is simply to get a radar environment where there was none before.

P-3 AIRCRAFT

Now, the P-3 is a superb aircraft. It was built for antisubmarine warfare and it has characteristics that lend itself very well to operations of this sort, particularly over water.

Unfortunately, however, there are very few P-3's operating anywhere in Latin America. There are a lot of C-130's. Everybody has C-130's. Almost all of the Southcom aircraft are C-130's and except for an occasional P-3 assigned for very short periods of time, Southcom had no P-3's assigned or operating with it for most of the 2 years that I was down there. I would say the exceptions were perhaps two or three aircraft for a period of a month or so.

CAPABILITIES OF C-130

In short, our experience is with the C-130, and the C-130 is an aircraft well equipped to handle the exigencies of flying in Latin America, particularly up in the Andean region. We do it habitually. Therefore, the training, the maintenance, the operational bases for proceeding is significantly stronger with C-130's in Latin America than with P-3's.

I would make no similar case for operations out over the Caribbean lands. There I think the P-3 would be in its proper environment.

Senator **DeConcini**. Do you think the C-130 properly equipped with the radar, of course, can be as effective as the P-3?

General **Gorman**. I have no doubt.

Senator **DeConcini**. Wherever it is homed—whether it is in the Andes or along the southern border of Mexico and the United States or in the Caribbean?

General **Gorman**. I have a great deal of respect and admiration for that aircraft. I think it can do the job.

Senator **DeConcini**. Thank you.

USE OF RESERVE UNITS

One of the remaining issues to be resolved by the air wing amendment is whether the DOD missions should be tasked as a special operating wing or a Reserve unit.

Do you have an opinion as to which may be the best way to go, just for those who are no longer in the service?

General **Gorman**. Senator, as you know, Southcom worked habitually with reservists. Most of my aircraft down there were flown by National Guardsmen or Air Force Reserve pilots. I am entirely confident that the Reserve component solution would work in Southcom because of its extensive experience with handling that relationship between the Active and the Reserve components.

Obviously, since reservists cannot devote all their time to the mission, you pay a price for rotating the crews. In the best of all worlds you would have active full-time fliers devoted to this mission.

If you want to get maximum return for effort invested, a full-time dedicated unit would produce better results.

Senator DeConcini. Is it fair to say then that the optimum would be a special operating wing?

General Gorman. Yes, sir.

Senator DeConcini. But a Reserve unit, based on your experience in Southcom, can provide a tremendous benefit?

General Gorman. Right.

INVOLVEMENT OF U.S. FORCES IN DRUG ARRESTS

Senator DeConcini. Representative Bennett and others in the House intend to propose an amendment to the DOD authorization bill that would, among other things, authorize direct involvement of U.S. forces in drug arrests outside of the borders of the United States, particularly on the high seas.

This would require a change in the current Posse Comitatus Act whereas our drug air wings legislation could be achieved within the existing law.

What is your position on direct involvement of U.S. military forces in drug arrests?

General Gorman. I saw enough instances, sir, in which we were fairly certain that we had an arms carrier under surveillance to lead me to itch for authority to act while we had the guy in hand.

I have sat at my breakfast table down there in Panama and watched ships go through the canal that I knew were loaded with marijuana. I wished it had been possible to intervene on a number of occasions.

I understand, however, all of the natural reluctance, both in the Department of Defense and the Congress, to extending that authorization to military forces.

I would suggest perhaps there is a way that that could be accommodated by positioning Coast Guard detachments aboard naval vessels that are operating in the waters near Latin America.

Senator DeConcini. General, if the Posse Comitatus Act were amended to permit direct arrests under certain guidelines in peacetime, in your own judgment, would our national security be jeopardized at all by that?

Isn't it a matter of decisionmaking and leadership as to when it is done and where the priority is?

General Gorman. Senator, my colleagues in the Department of Defense are understandably very concerned about what they term detracting from the readiness of the Armed Forces with such missions. I can share their visualization of a frigate diverted from the antisubmarine war screen to go out and chase some rust bucket loaded with pot.

But by and large what we are talking about here is entirely consistent with the mission of the forces that are operating in that area and the sorts of activities that would be entailed in providing the surveillance and acting on it are dammed good training for wartime missions.

So, in my view, the argument that it would detract from readiness is not substantive and I believe, to the contrary, there is much to be gained in the participating forces from throwing themselves into the mission wholeheartedly.

Senator DeConcini. You would really have an opportunity to do training that is very appropriate for readiness and at, the same time, be involved in the South American drug traffic?

General Gorman. Yes.

Senator DeConcini. That is very helpful.

That is my last question. The other ones I will submit, Mr. Chairman.

INTELLIGENCE GATHERING BY SOUTHCOM

The major recommendations that you make for improving the military role in the drug war is to premanently task Southcom to participate in the gathering of intelligence pertaining to drug-related activities in Latin America and to improve intelligence for it to governments that cooperate in drug eradication.

Can you elaborate on this intelligence-gathering role for Southcom under the Gorman plan and tell us what specific steps you would recommend for sharing drug intelligence with the U.S. law enforcement agencies such as Customs, Coast Guard, and DEA?

General Gorman. As you are aware, sir, the Southern Command today collects a great deal of information about movements generically in Central America and the waters adjacent thereto in particular.

It does not have available to it on a routine basis comparable information collected by the civilian law enforcement agencies on movements. This detracts, it seems to me, from the intelligence that Southcom is supposed to be collecting and deprives the civilian agencies of information that conceivably could have shed light on the information being collected by the law enforcement.

The day that we were together in Miami recently after the hearings I walked across the street to the information center that has been established by the law enforcement agencies, the interagency cooperative effort underway over there, and asked to see, as one normally would in walking into an intelligence center, the last several hours' worth of messages, so that I had some idea of the kinds of information that were being tasked.

On the top of the heap was a message pertaining to an aircraft that had moved through Central America, landed at a specific point and took off bound for the United States.

Now, that particular landing place could have been surveilled by the U.S. Southern Command or by the U.S. naval forces that are in support of the U.S. Southern Command, but neither Southcom nor Lantcom were addresses on that message. In short, they did not know of this particular event.

Now, in talking with colleagues in the law enforcement agencies, I am persuaded that they know a great deal that will help explain some of the phenomena that we have been observing on the fringes and wondering what was going on, and I believe very stongly vice versa.

On the occasions where we have brought those folks down to Southcom and put them cheek by jowl with our intelligence people, we both have learned a great deal in a short period of time. That experience leads me to the recommendation which you mentioned.

Senator DeConcini. Let me touch on one more quick thing.

AUTHORIZATION OF AIR WING

On the air wing authorized under the Department of Defense authorization, if you have had an opportunity to see the language of that amendment, I presume your feelings are just as strong as they were in Miami that this is a proper and a good way to go; there is nothing that has changed your mind?

General Gorman. I have not seen the language, sir, but I am convinced it is a useful step.

Senator DeConcini. Thank you, Mr. Chairman.

I have a few more questions. If we have time, I will ask them on the next go-around.

Senator Sasser. Thank you, Mr. Chairman.

General Gorman, I received information on Thursday of last week that Colombian officials had raided a cocaine lab in southwest Colombia about 300 kilometers from the capital of Bogota. This lab was capable of producing 3 or 4 tons of cocaine paste per week we were advised.

Apparently this was the second cocaine lab which has been closed down by Colombian officials in just the space of 1 week. Now I am told that in the past year Colombian officials have confiscated close to 1 million tons of cocaine.

So, on the surface it would appear that we are meeting with some success in the war on cocaine in Colombia. But then last week the voice of America's Latin American service indicated that once these labs are closed up in Colombia that they are located elsewhere in other South American countries and they get right back in business and we are frustrated.

What can you tell us about that statement?

General Gorman. Again, sir, having been out of uniform for a month, I do not have any access to information on recent events there that go beyond what has been in the newspapers.

I do know, however, that we were already seeing in March evidence of a shift in the operations of these large drug operators moving their operations out of Colombia into adjacent areas of Venezuela and Brazil. So, any step that we take here is going to have to anticipate a very well financed, very flexible counter by the operation.

A second point. Central to all of this operation is the ability to move materials around by air. It is the air trafficking that makes it possible for them to use these remote jungle locations for what amount to large factory style operations.

Here again the notion of radar-equipped aircraft and the ability to localize and pinpoint these operations become sine qua non for effective counteraction of the sort that you are citing.

So, once again I come to the conclusion that by helping these foreign governments develop the capability to police their own remote areas, we will develop considerable leverage on these large-scale drug processing operations.

Senator SASSER. General Gorman, I applaud the efforts that have been made. I wish you the greatest possible success and your successor the greatest possible success in this very vital area of eliminating the poison from the bloodstream of our Nation.

REDUCED PRICE OF COCAINE

But I am chagrined when I learn that the price of a kilo of cocaine in the Southeastern United States has fallen as much as two-thirds, some say, in just the last year. This would indicate that we have more rather than less cocaine entering this country, presumably from South America.

Now, if that is correct, just how successful are our interdiction activities at the present time, in your judgment?

General GORMAN. We are no more than a nuisance to these people, Senator Sasser.

Senator SASSER. General, I am distressed to hear that.

Senator STEVENS. Can you pull the mike up, General. I can't hear you.

Senator SASSER. I think the General said we are no more than a nuisance to these people at the present time.

We are bombarded with press releases saying that the administration is winning the war against drugs. I see on national television one of the most burgeoning new businesses in this country is treating cocaine users who are trying to finally at long last, some of them, to break the habit.

Now, if more cocaine is indeed entering this country, if the price is falling from $70 per kilo down to $20 per kilo, it appears to me we are not winning the war against cocaine.

I saw a report just last evening of a farmer in the Midwest who has been taking cocaine. It has even gotten into the hands of farmers in that region.

Is it your view, General, that at the present time we are not winning the war against these cocaine manufacturers and drug runners operating out of South America?

General GORMAN. Senator, I am not now and never was in a position in Southern Command to comment on the war in the United States.

Do you know where I was I can tell you that the shipments this year were larger than they were last year and the trends are all upward.

Senator SASSER. I am sure that was very frustrating to you to sit there and watch this. You indicated a moment ago you could see the ships from your breakfast table in Panama moving through the Panama Canal, knowing full well that some of them were loaded with drugs and marijuana.

To your knowledge, General, has the National Command Authority ever granted approval to any proposal to utilize, for example, Special Operations Forces, Special Forces to interdict any of these drugs at their source?

General GORMAN. No, sir; not to my knowledge.

USE OF SPECIAL FORCES

Senator **Sasser**. Have you ever recommended utilizing U.S. special forces to go to the source of drug production in order to stage a preemptive strike against the drug manufacturing facilities or against these individuals who manufacture these drugs?

General **Gorman**. No; but I think that such action by the United States would be both unnecessary and conceivably counterproductive. Unnecessary in the sense that I have been told again and again, and I believe my interlocutors, that if they know where the drug operations are, they will act, and they have, based on the several occasions on which we have been able to help them in that respect. Counterproductive in the sense that the Narco traffickers make considerable capital out of the pressure that the United States has brought to bear on these governments down there, transforming the drug trafficking into a kind of nationalist cause, anti-American cause.

There was recently played on public television broadcasting here in Washington an interview with Carlos Layda, who is a prominent Colombian trafficker in drugs who was photographed in green fatigues surrounded by people with weapons in a guerrilla camp talking about a war against the United States and characterizing the several attempts of the United States to extradite Colombians, bring them to justice here in the United States, as intervention into the internal affairs of this country and seeking in these statements to rally Colombians to resist American pressures.

So, committing U.S. forces in a place like Colombia, it seems to me, would tend to vitiate the efforts of the government there to deal with the problems on their own terms.

It seems to me our proper role is the one we have been playing, providing technical assistance, and I would like to see that assistance increased.

Senator **Sasser**. I don't disagree with what you are saying and I think that is a very thoughtful and mature approach to the problem, if I may be allowed to say so. But let me play the devil's advocate for just a moment.

You have indicated some of these drug manufacturing operations take place in areas that are so primitive and so loosely governed, if governed at all, that the government cannot even conduct a census in that area that would be reliable, let alone having a police force in place that would be efficient and uncorrupted that would help stamp out the drug operations.

USE OF SPECIAL U.S. FORCES TROOPS IN DRUG BATTLE

Some have recommended that in that particular instance, after proper consultation with the goverment in question, that we would be justified, for example, in using Special Forces troops of the U.S. Army to try to destroy this drug manufacturing capability.

What would be your response to those who suggest that?

General **Gorman**. I think the justification could be established, if there were an appropriation and it was clear that the next step beyond the processing plant was at someplace in the United States, but I would regard it very unlikely that you would be able to get any government down there to agree to have U.S. forces operate within their orders in that fashion.

I can see some considerable hazard to that in the sense that what we want is to get those governments to do the job themselves. The propensity might be, if we started intervening in that fashion, for them to sit back and let us carry the whole load. That has been the difficulty up until just last year.

When I went down to Southcom, Senator Sasser, I was told by virtually every ambassador with whom I discussed the problem that the day would never come when we would see these governments taking action against what they regard as an American problem.

As I was told 3 years ago again and again, from the perspective of the Peruvian, Ecuadorean, or the Colombian Governments, it is the American consumer that causes this problem, not this Government. It is our greed, our depravity that has brought about this state of affairs, and, therefore, it was impossible to expect those governments to act.

Well, since those governments have learned, as we all have, that anyone who tolerates these illegal organizations to operate within their borders doesn't look at their own hazards, and in Colombia in particular there has been a widespread sale of a particularly pernicious form of drugs to middle-class and upper-middle-class youths which has caused a revulsion among their parents over the drug problem, suicides, disabling, et cetera; and, of course, the assassination of the Minister of Justice last year brought the Colombian matter to a head and made it possible for the first time for the Colombian Government to act.

I must also tell you at this time I was being assured by our ambassadors that action by these governments could not be expected, I was hearing from the Ministers of Defense and other senior military officers in those countries expressions of deep concern over this drug business which they saw as a threat to their national security.

I told the ambassadors that I thought that if we worked the problem correctly, waited it out and took advantage of the developing situation, the day would come when in fact the Government of Colombia or the Government of Peru or the Government of Ecuador would come to us and ask for help, and that day did come, sir.

LIMITS PLACED ON USE OF SPECIAL OPERATIONS FORCES

Senator SASSER. One final question, General, and I don't mean to unduly dwell on this proposition of using U.S. special operations forces to interdict drug activity, but that is a matter which has been floating around, as you know, for some weeks now, perhaps some months.

What are the present limits that are placed on the use of special operations forces in drug interdiction activities by DOD?

General GORMAN. The War Powers Resolution would bear. These would be forces equipped for combat. Anybody who was put in against one of these drug operations would have to expect to fight.

These people are well armed. In many instances they have formed leagues with local insurgent organizations and in the case of laboratories in Colombia last year, in any event, they were literally ringed with guerrilla units, very well armed guerrilla units, who were prepared to fight to prevent the government or any other force from getting in there.

So, all of the structures that would bear on the insertion of Americans in combat anywhere in the world would apply here.

Now, I presume with appropriate authorization, in consultation between the legislative and executive, we could proceed on that basis, but I want to go on record that I am against that.

I think that when we get Americans doing the job that the Colombians, the Ecuadoreans, the Peruvians ought to be doing for themselves would be making a policy mistake and a strategic error.

Senator SASSER. Mr. Chairman, I have additional questions, but I don't want to take any others' time. Suppose I come back on the next round.

Senator STEVENS. I hope in submitting questions to the general you understand he has no longer a staff at Southcom behind him. I would hope we would ask the questions and not burden him with the problems of trying to find a secretary now.

Senator SASSER. I will ask them now, Mr. Chairman.

Senator STEVENS. Let me ask mine first.

I want to thank you, General. I was late today because of a meeting with the President.

I remember so well our meetings with you in Honduras and the things you were doing down there in Southcom. I am pleased to have the opportunity to see you here before this subcommittee. I hoped to be here so we could limit the scope of this hearing to the things within the jurisdiction of this subcommittee. I will try to redirect that now to see if I can.

INCREASED USE OF MILITARY IN DRUG WAR

We have done a lot of things to try to help on this effort that you have spark-plugged with the Defense Department's cooperation in terms of support for the drug interdiction forces.

We have increased flying hours for the Navy. We have directed the transfer of Army helicopters to the Customs Service. We have sponsored F-15 radar for the Coast Guard and that was for the P-3 aircraft that they have. We have insisted that the Navy loan Grumman Hawkeyes, the AWACS concept, E-2C's to the Coast Guard.

I have read your statement, by the way, and I thank you for it. I understand you summarized it before I got here.

I am one who does believe that the drug importation problem is a national security problem and we would like to do everything we can to help.

You mentioned some recommendations here to provide intelligence reports to the cooperating governments, add $30 million for security assistance. That, unfortunately, is not within the jurisdiction of this committee.

You say augmenting equipment funding and personnel authorization to Southcom to effect the program foregoing. I take it that is in terms of problems of additional assistance to counter drug action with support forces from defense. I think we had some conversation about this once before probably.

So, I want to thank you again for coming.

MORE INVOLVEMENT BY APPROPRIATIONS COMMITTEE

What I would like to know is: What do you think this committee—we have jurisdiction over the Defense Department budget—what do you think we ought to do to increase the ability of the Department to combat drug traffic within the concepts, as you understand them, of their military role, and we are talking about your former Southcom?

What do you think we can do specifically?

General **Gorman**. I think you could ensure that the authorization bill explicitly directs the Secretary of Defense to support the civilian law enforcement agencies, particularly with respect to intelligence support.

Again, sir, I understand that intelligence is not a panacea, but when you are dealing with a phenomenon of this size, this magnitude, only the Department of Defense can cope with it, only the Department of Defense has the communications capability, of staffing, the information, the manipulation capability to handle the job.

If we are being thought out by this problem today, it is largely because we have not mustered the capabilities of the Department of Defense in that respect.

Now, I am not arguing here for the deployment of battle groups or Air Force wings or committing Army helicopter units. I am simply suggesting that the Department of Defense communications and Department of Defense putative redoubtable capabilities in organized headquarters for the purposes of facilitating the flow of information among several agencies be brought to bear on this problem.

Senator **Stevens**. We had a hearing in New York on the same subject. General Tice was involved in trying to help bring about coordination. Were you in contact with him while you were still in command in Southern Command?

General **Gorman**. General Tice is an old friend. He was recalled from retirement for the purposes of coordinating this business. He is over the manpower side of the defense house. He is pretty well out of the operational business that I was engaged in.

COORDINATION OF OPERATIONS

Senator **Stevens**. Do you think we ought to have coordination on the operational side, too?

General **Gorman**. Up to now everything that has been done in terms of interagency cooperation has been done through the good will of the participants. There is not any directive authority. There is not any cohesive force to pull it together.

So, you have incidents coming up where we discover that the Narco trafficking are in many respects better informed in terms of communications intelligence than we are; that they are intercepting unsuspected voice communications among our law enforcement agencies.

The Department of Defense has capability to solve that sort of difficulty. It does not have to involve the diversion of competent units. It is support capability you are talking about here.

Senator STEVENS. That is a very good suggestion.

Senator CHILES. And it is training, you say, that could be the most valuable training you could have if you could find a cache of drugs that could be subversive that could be terrorists, that could be an enemy.

Senator STEVENS. They could also be people smuggling arms into El Salvador and some people on this table have not supported us in that. I think we have to be careful in suggesting we can turn them loose to look for drug smugglers, but in the meantime if you find somebody smuggling arms, they would not be able to do it.

As a practical matter, the problem is that we need to have the military perform its mission, but at the same time you are sugesting that we not put the military in charge, but you have military support of the intelligence activity of the civilian agencies that are trying to intercept these drug imports into this country, are you not?

General GORMAN. I am, sir.

LINK BETWEEN TERRORISTS AND DRUG TRAFFICKERS

Senator STEVENS. Do you know of any link between the drug traffickers and the terrorists organizations that are operating in the areas that you had your command in, Southcom?

General GORMAN. Yes, sir. Here in an open hearing it is difficult to talk about this freely, but it is very clear to me on the basis of the information at my disposal that anyone who wishes to pursue an illegal enterprise ends up doing business with the drug movers in one sense or another.

It is simply because they have the communications, they have the transportation. They have the informants in the various places. They can produce the illegal passports. They can produce the other documentation to permit movements.

So, in at least four specific instances that I am aware of groups who are bent what amounts to a terrorist attack on an established government, associated themselves with drug traffickers for the purpose of facilitating the operation, largely the movement of people, money and arms around the continent out of normal channels for such movements.

INFORMATION ON DRUG TRAFFICKER'S MOVEMENTS

Senator STEVENS. Within the course of normal military intelligence gathering activities in the area, your units would have come across those movements, would they not?

General GORMAN. Yes, sir.

Senator STEVENS. What did you do with the information when you were in command of Southcom?

General GORMAN. Of course, I provided that promptly to the Defense Intelligence Agency and the CIA for appropriate dissemination.

Senator Stevens. You would like to see additional support to the intelligence forces involved in combating drugs. That is what I am trying to find out.

ADDITIONAL SUPPORT TO INTELLIGENCE FORCES

What kind of support do you have in mind that we are not providing now? What could we provide or require the Department to do that it is not doing now?

General Gorman. We are talking about two different sorts of intelligence information.

One of them is a specific estimate, the purpose of your question, where we come across evidence of a terrorist operation of a specific sort. That kind of information flashes throughout the intelligence community pretty quickly and routinely. I am not worried about those.

But the day-to-day dispositions of ships, the operations of aircraft in the region, the large mass of data, most of it in and of itself utterly meaningless, has to be put together with other information in order to interpret its significance.

This kind of large-scale collation of information is the kind of operation that the Department of Defense, the Armed Forces, are constituted to handle. I suggest to you that the law enforcement agencies frequently are not.

Senator Stevens. I appreciate that.

One of the things that has been drummed into us is the problem of protecting the sources of military and general intelligence information in order, obviously, to preserve the network to obtain the information we need for intelligence assessments.

You are familiar with that network that we used in our former command area?

General Gorman. Yes, sir.

Senator Stevens. Would your suggestion be in any way contrary to the primary purpose of military involvement in intelligence gathering in that area?

General Gorman. I do not believe so. I believe that provisions can be made to safeguard sensitive sources. It is done routinely within the military intelligence realm. I believe that it could be readily applied to the law enforcement business.

Senator Stevens. We can mandate to the Department on an annual basis without any authorization to use part of the funds that are available under this bill to take particular action. We have done it in the past.

As a matter of fact, the Senator from Florida put some suggestions in the hearing we had in New York and from the Senator from New York the same kind of suggestions were forthcoming.

What would you say that we ought to do to require more coordination among the Federal agencies, including the military, in order to utilize this information which you know is available?

General Gorman. Why don't you give the Vice President direct authority to make an effort?

Senator Stevens. You would suggest that we have a special committee under the Vice President to coordinate this?

General GORMAN. No. The Vice President right now is attempting to make all this happen, but he does it by coopting the cooperation of the several agencies. Particularly in the intelligence realm I would think some form of mandated centralization would be beneficial.

Senator STEVENS. I am reluctant to tell the Vice President what to do. The President might send him somewhere else.

I have one last comment or question for you.

INCREASED INTELLIGENCE CAPABILITY

In your service down there, and again the members of this subcommittee do appreciate the time you spent with us when we were down there, did you find any deficiency or any material or equipment that was lacking that would have helped you at that time as commanding general of Southcom, to provide the kind of assistance you would have liked to have given to this effort to interdict the drug traffic and try to suppress it?

General GORMAN. I obviously would have liked to have had more intelligence capability that I could have focused on this effort.

Senator STEVENS. Let me ask a peripheral question here.

AGENCY SUPPORT FOR SOUTHCOM PROGRAMS

At that time did you rely on DIA [Defense Intelligence] for your support or were you relying on the CIA for support?

General GORMAN. I had established a very close working relationship with all of the several military intelligence activities, the National Security Agency, the Defense Intelligence Agency and its several arms, and I had a superb working relationship with the Central Intelligence Agency, very close.

I did not have a similarly close working relationship with the law enforcement agency, although that got better month by month throughout the years that I was in command.

There is now a Coast Guard officer assigned to headquarters Southcom. Within the past year on several occasions we brought DEA officials down and put them into the headquarters for the purposes of assisting the flow of information during these short exercises off the coast of Colombia, with good effects. It is that experience that leads me to believe that more of that would help.

But to get back to your question on materiel, by and large, I operated with what the JCS gave me from the resources of the Services. I think we used what we got to good advantage.

I could have used more. I could have used more in particular to go after the flow of drugs. I was not missioned to do that and I did not have the resources to spare to follow up on it except when we had a hot lead such as on one of these terrorist operations.

MISSION IN SOUTHCOM

Senator STEVENS. The Secretary is going to be here later as we wind up this set of hearings this year. I will remember to ask him why is that not there. I don't know the answer to that, why Southcom in particular doesn't have a special mission allocated to it to assist in this total problem.

I think that in the days when we were involved in Korea and Vietnam we had our attention called to a heavy drug traffic that was taking place it that part of the world. Now we are a little bit more involved in trying to support efforts of the freedom-minded people in Central America, knowing we have greater knowledge of what is going on down there.

I think we ought to use that knowledge and you make a good suggestion along that line.

General GORMAN. Absolutely.

REGIONAL ORGANIZATION ON DRUG TRAFFICKING

Senator CHILES. General, in the Foreign Assistance Act recently passed by the Senate we included language requiring the Secretary of State to report to Congress on the feasibility of establishing a regional organization in Latin America to combat narcotics—that is something that you raised in our hearings in Miami—this group to organize a joint force to combat narcotics production and trafficking, coordinating intelligence, identifying traffickers, and establishing eradication teams.

If this passes, this becomes law, and the Secretary of State is given that task, how would you see Southcom integrating this kind of concept?

General GORMAN. General Galvin, if he gets a crack at that mission, I am confident will face some serious challenges in fielding with the several governments and their Armed Forces.

Nonetheless, the language that you cite seems to go directly to the problem that we were just discussing, that is, that these trafficking organizations are transnational and they are moving out of Colombia now into adjacent areas.

So, to counter them, you have to have a transnational operation of some description. General Galvin in Southcom has in place officers who are capable of providing advice and assistance to cooperating governments and we can very readily get in their experts from our special operations forces or our intelligence community to supplement that effort.

So, I could see General Galvin being a prime actor in helping the ambassadors to establish this organization.

U.S. SUPPORT OF FOREIGN ANTIDRUG UNITS

Senator CHILES. The very thing Senator Sasser was talking about, this would not necessarily be our forces, but we could provide assistance, logistics, training, communications, intelligence, even in some instances perhaps transportation on a request from this transnational force that would be down there seeking to carry out these objectives.

General GORMAN. One thing in that catalog you might add would be technology transfer. The F-15 radars apply to their aircraft or a radar of that capability to give them an airborne radar capability would seem to me to be a good step.

There are other devices similar to that that we might make available to them that would be a great help.

Senator CHILES. Thank you.

RED TAPE INVOLVED IN FEDERAL ASSISTANCE

Senator Stennis wanted a question asked. He pointed out right now the Department of Defense can assist Federal agencies and State and local agencies by participating in especially lending boats and other equipment.

The point he makes is that the officials tell him the redtape involved makes it much more trouble than it is worth to have this assistance. He wants to know whether you agree it is a problem in this regard and if so, what would your advice be for any steps that could be made to sort of reduce that with State?

General **Gorman**. I am confident that the problem the Senator refers to is a very significant one, but I suggest it cuts both ways.

There are large amounts of materiel formerly in the hands of NARCO traffickers that are right now impounded, seized by the courts, that could be turned to good advantage against them if we could find some way to make that transfer a little bit easier.

I would argue, therefore, not only do we need to address the question raised by Senator Stennis, but the possibility of making it easier for the Armed Forces or the civilian law enforcement agencies to get their hands on some of the materiel that has been captured in the counterdrug operations.

CUBA ROLE IN DRUG TRAFFICKING

Senator **Chiles**. At the Miami hearing Congressman Pepper of Florida called Cuba's role in drug trafficking a coldly calculated, clearly coordinated attack on our security and that of our American neighbors. You concurred in that assessment.

I wonder if you could elaborate on the evidence you saw in Southcom files that showed a direct or indirect involvement of Cuba in narcotic trafficking?

General **Gorman**. Again, you are inviting me into the realm of classified material.

Senator **Chiles**. I ask you to sanitize your testimony.

General **Gorman**. I will try to figure out how best to do that.

Senator, we know a good bit about air and sea movement in the Caribbean. It is natural that military forces, particularly in and around Cuba, we would be keeping track of. There are aberrations detectable in those movements and those aberrations could only come about as a result of a decision of the Cuban Government.

They, after all, intervene in such matters as a general rule. These aberrations provide in effect corridors through which we know the drug traffickers are moving. So, one aspects of this business relates to the general flow from south to north in and around Cuba.

MOVEMENT OF INDIVIDUALS

There is a second genre of information at our disposal which has to do with the movements of individuals. Most of the individuals to whom I refer are kingpins or key men of one sort or another in the drug trafficking operation.

These individuals we know are aided by the Cubans in the course of their movements in the area. They are aided in the sense they are provided information regularly, provided documentation, they are sometimes provided transportation.

But the Cuban official apparatus seems to be at their disposal in a number of significant answers.

Finally, if you will accept the general premise that in countries like Cuba or a country like Nicaragua where there is a very significant Cuban presence, it would be difficult for any kind of large-scale operation such as some of these drugs nets, of which we are aware, to be taking place without the Government—we know about it, surely their intelligence appartus is much better informed.

In the sense of Nicaraguans it seems evident that both Nicaraguan hierarchy and their Cuban advisers are well aware of the goings and comings of these people flying drugs out of Columbia through Nicaragua to the Southern United States.

Without getting more specific than that, I think you can see the kinds of information that we would be dealing with in that respect.

So, I conclude that both the Nicaraguan Government and the Cuban Government knew of these operations and if they did not condone or actively support them in all instances, they were at least aware of them and did nothing to impede them.

Senator CHILES. Thank you.

Senator STEVENS. Senator D'Amato.

Senator D'AMATO. Thank you very much, Mr. Chairman.

Senator Chairman, because of time limitations, I would like to submit——

Senator STEVENS. The general no longer has a staff. If you want to ask him questions, ask him questions.

PREPARED STATEMENT

Senator D'AMATO. I would like to submit a statement for the record.

Senator STEVENS. Go ahead.

Senator D'AMATO. Then I would like to commend the chairman and Senator DeConcini of this committee for holding these hearings.

STATEMENT OF SENATOR ALFONSE D'AMATO

Mr. Chairman, it is a pleasure to be here with you and with Senator DeConcini: Both of you have been in the forefront in our war on drugs. I look forward to hearing the testimony of General Gorman, the former commander of the United States Southern Command.

All of us here agree that fighting drug trafficking is as important to our Nation's security as is any weapons system. We are at war with well-financed and well-equipped international networks whose $100 billion a year income dwarfs our drug law enforcement budgets. Their drug smuggling planes so often outfly and outnumber our drug interdiction planes that we stop less than 1% of the 19,000 drug flights that cross our borders each and every year.

These networks have killed and kidnapped our agents in Mexico, Peru, and Colombia. They collaborate with terrorists and operate guns-for-drugs networks in Europe, Asia, and Latin America.

We have only just begun to commit the necessary resources to this battle. Two weeks ago, the Senate unanimously passed Senator DeConcini's amendment creating an Air Force Reserve Wing with radar drug surveillance as its major peacetime mission. This will commit up to 16 radar planes to this battle. I flew on one of these planes last year, and it has been most effective in its patrols on the east coast and along our southern border.

This week, at the request of Mayor Koch of New York City, Congressman Bennett is going to introduce an amendment to the Defense Authorization Bill that goes a step further. It authorizes our Navy personnel to stop and arrest drug smugglers on the high seas. I support this measure.

We must recognize that an expanded role for the Defense Department is only part of what we need. I am pleased that we on the Appropriations Committee are making progress in putting together a $60 to $70 million increase in the budgets of our civilian drug law enforcement agencies: the Drug Enforcement Administration, the U.S. Attorneys, the Coast Guard, and the Customs Service.

Mr. Chairman, there is no greater challenge we face than winning the war on drugs. We are not winning that war now, but with the leadership that you, Senator DeConcini, General Gorman, and others are providing, and with the tremendous dedication of the men and women in the field, we are starting to win some important victories. This is a war that we must win, Mr. Chairman. Our country's future depends upon it.

CUBAN INVOLVEMENT IN DRUG TRAFFICKING

Senator D'AMATO. Let me say I have the opportunity to meet with the general who testified at the hearings in New York on the drug problem. I commend him for his leadership in this area.

If I could pursue the question Senator Chiles brought up——

Senator STEVENS. Don't interpret me as in any way limiting you. We are in no hurry. The general is in no hurry. I know in the past we submitted questions to him and he had assistance in preparing answers. If nothing else, stenographer and a few other things.

Senator D'AMATO. Sometimes they are better off not to have them prepared.

Let us pursue this business with the Cuban Government.

Isn't it true that there have been, I think, indictments pending against one of the Ministers of Interior or Deputy Minister of Interior of the Cuban Government? Are you aware of that?

General GORMAN. I can't comment on legal proceedings.

INTERRUPTION OF VESSELS ON HIGH SEAS BY U.S. NAVY

Senator D'AMATO. Last week, Mayor Koch of New York was successful in getting Congressman Bennett to introduce an amendment to the defense authorization bill that goes a step further than we have done in the DeConcini amendment that authorizes our naval personnel to stop and arrest drug smugglers on the high seas.

I support that measure, by the way. Let me ask you something.

What is your opinion of that, and wouldn't that help our effort tremendously?

General GORMAN. I indicated in response to an earlier question, sir, that there were instances where I itched for the capabilty to act on information at my disposal, but I said that I thought that the same sort of capability could be obtained by putting Coast Guard detachments on naval vessels operating in the areas where such contact might be anticipated.

Senator D'AMATO. Again, given the limited numbers and resources and the battle we have continually to maintain personnel in the Coast Guard, aren't we really working at cross purposes?

Particularly if the Navy ship is in the area where there is a drug ship and we have reason to know where and when they operate, would that hurt the military readiness?

Why not have the Navy, under these circumstances, stop that ship instead of going through the kind of thing that the mayor describes where we have to get a special authorization from the President of the United States and take down one flag and put up another—all kinds of rituals?

It is almost a shame. Why not fight the war?

General Gorman. I, of course, am all for fighting the war, Senator.

Senator D'Amato. What about the use of the Navy?

General Gorman. Fine.

Senator D'Amato. Good. That is good.

NATION'S SUPPORTIVE OF U.S. ACTIONS

General, I read your testimony on page 5 with great interest.

What countries do you think are most enthusiastic or more supportive about the counteroperations you have discussed in your statement and what countries are less than enthusiastic?

General Gorman. That is one of those questions where talking about it is not going to help anything. You know, one of the difficulties that all of these governments face down there is that there is a significant internal opposition to cooperating with the United States.

Every President down there who cooperates with us in terms of extradition or in terms of committing additional police or military assets does so at some hazard to his own position and his party's position in the legislature.

Having said that, Colombia is, I believe, now persuaded as a government that they have to close down these operations. I think the Colombians would respond affirmatively to cooperative measures by the United States.

I think that Ecuadoreans are increasingly aware that as the pressure mounts in Colombia, the threat to them increases and that they have got to do something or other about that vast unpoliced, unsurveilled Amazonia of their own.

I believe that the Venezuelans are increasingly apprehensive about evidence that the spillover from Colombia is affecting them.

Finally, of course, the Peruvians are at this point in time deeply apprehensive about drug operations in and through Peru.

Bolivia, which is the main provider, continues to be sorely divided on the drug issue, among other issues, and not in the same position to act.

SITUATION IN BOLIVIA

Senator D'Amato. Regarding Bolivia, why does the Bolivian Government really fail to take the kind of meaningful action that you have mentioned and that some others have?

Is it beyond their capability? Has the drug machine down there become so powerful?

General Gorman. The Bolivian Government scarcely functions as a government in any matter. Take something like this which is so close to the culture of the Bolivian peasant where chewing cocoa and raising cocoa has been a way of life for generations, and to expect the Bolivian Government to be able to cope not only with this cultural resistance but with the arguments of the left that cooperate with the United States in this respect is a surrendering of Bolivian sovereignty, that weak, divided, impotent government threatened by the left on the one hand and the military coup on the other just is too much to ask of it.

Senator D'AMATO. General, given that state of affairs that exists in Bolivia, what do we do there? How do you handle that?

General GORMAN. Very gingerly. You cope. You do the best you can. I think the mission down there has done a remarkable job with almost no leverage. There are those here in the United States who would argue that Bolivia is a fertile field for increasing United States efforts to attack drugs at the source.

I am skeptical about that. I think you will have to get it further upstream. I just think the Government in Bolivia is so fragile an apparatus you could not expect much even with fairly generous assistance.

I just don't see much return on investment coming out of that.

Senator D'AMATO. Mr. Chairman, I have no further questions.

The general's very candid assessment, I think it is important for us to reflect, really shows the depth of the problem.

We talk about cutting off foreign aid, we talk about taking punitive measures, but there are those areas where drugs are produced and distributed in which we do have very little leverage.

Consequently, I guess that interdiction, surveillance, movements that we are beginning to undertake are the next best efforts that should be applied on our part.

Mr. Chairman, I thank you for holding these hearings. I thank you and Senator DeConcini for your leadership in this area. Let me once again thank the general for his efforts.

Senator STEVENS. Senator Proxmire.

Senator PROXMIRE. Thank you, Mr. Chairman.

ECONOMIC COST OF USING U.S. FORCES AND MATERIAL

General GORMAN. I am very, very impressed. You are almost too good to believe. Here we have something that had not occurred to me before that we can use facilities we now have, planes we now have, trained personnel we now have, to do a job that is expert, competent, and probably improves their training.

What cost is involved in this?

I am not talking about the risk. I am talking about the economic cost.

General GORMAN. If you look at it in an absolute sense, probably there isn't any because those airplanes are going to be in the force and people be up there boring holes in the sky for purposes of putative training, in any event. They all have to fly someplace. My argument is we might as well put them to good use.

CENTRAL AMERICAN NATIONS INVOLVED IN DRUG TRADE

Senator PROXMIRE. General Gorman, in Maimi you testified the Nicaraguans had been flying planeloads of cocaine to Florida and that this activity is supported by the Nicaraguan Government. You said that uniformed Government personnel helped to service smuggling aircraft and load those same planes with drugs.

You also noted that the military force that protected the cocaine processing base at Tranquilandia in Colombia was a group of uniformed members of the armed wing of the Communist Party of Colombia.

Finally, you testifed that Cuba is deeply involved in the narcotics trade.

Can you tell us about these or any other governments within the Southcom region that are either overtly or covertly involved in the drug trade?

Tell us about both governments in power and opposition parties that might be dealing in the drug trade.

General GORMAN. The Southcom area does not include Mexico, but I would begin my response by pointing out that, as the relations concerning the death of the DEA agent in Mexico have been made evident, there was at least some involvement at some level by Mexican police in the drug operations he was moving in on.

Concerning other governments, to the best of my knowledge and belief, only the Governments of Cuba and Nicaragua in this part of the world, Bulgaria in Europe, as a matter of apparent State policy, are involved in the drug business.

NICARAGUA

The Nicaraguan case seems particularly flagrant. Nicaragua is a small country. Not much goes on in Nicaragua that involves movements of aircraft on international airways which could conceivably take place without the Nicaraguan Government knowing about it.

As a matter of fact, in that particular instance they actually shot at and damaged an aircraft on one attempt to fly up to the United States. It had to land and be repaired before they got their act together and got well enough coordinated to permit the flight to take place. But it was obviously manipulated from the top, that whole operation.

To be fair to the Mexicans, there is clever evidence that there are government officials of other countries that have been corrupted and are cooperating.

It is also very evident that one of the constraints on our securing better response from countries like Colombia is precisely the fact that those who should be helping us are either in the pay of the narcotraficantes or frightened out of their wits and failing to act for fear of retribution from the narcotraficantes directed at themselves personally or their families.

Fear, in short, is a very real factor in all of this business. But as a matter of State policy, you have to say Cuba and Nicaragua.

LINK BETWEEN GUNS AND NARCOTICS

Senator PROXMIRE. In your testimony before Congressman English's subcommittee in Miami you said:

> The drug trade and the gun trade are related as intimately as Roman slaves in other areas.

You went on to say:

> The propensity is for those who lend themselves to political violence to seek out the narcotraficantes and vice versa.

Can you tell the subcommittee what you can about your experience witnessing the link between guns and narcotics trafficking in and around Nicaragua, El Salvador, and other Latin American countries in the Southcom region and what is your overall assessment of the danger of the drug trade to United States national security interests in Latin America?

General GORMAN. There have been two clear cases in Miami in the past year in which arrests took place. Individuals from Central American countries came to Miami with drugs for the purposes of translating the drugs into money and the money into arms and moving the arms back to Central America for the purposes of attacking the government.

One of them was a plot against the President of Honduras. The other was a plot against the President of Guatemala. Both of these were plots of the rights. But the pattern that was laid out there was one that they reached for, sir, because they knew it was possible to take drugs to Miami, sell them and get guns and move them back to the region. It is being done all the time.

To what extent does this pose a threat? Well, to the degree that we have an interest in seeing governments like Roberto Suazo Cordoba's in Honduras survive, it seems to me we have an interest in attenuating the use of our sovereign territory for those kinds of adventures.

The fact of the matter is that Roberto Suazo Cordoba, like Napoleon Duarte, is threatened alike by individuals with guns who represent Marxism or who represent antidemocratic forces of the right in their own societies.

Both of these groups are in the drug business for the purpose of providing violent wherewithal to make their brand of revolution succeed.

The revelations that Roberto D'Aubisson's hireling was up in Texas with drugs to acquire money was a prominent factor in Duarte's recent electoral triumph down in El Salvador.

Again, what I am telling you is that it is well understood in Central America that this kind of trafficking takes place.

DRUG TRADE IN COSTA RICA

There was an official commission in Costa Rica 3 years ago which inquired deeply into the drug trade in Costa Rica. Their findings, which are a matter of official record, are that the drug traders are the arms traders and that they constitute a threat to public safety in Costa Rica.

Senator PROXMIRE. One last question.

BLOCKADE OF COLOMBIA AND BAHAMAS SUGGESTED

Congressman Claude Pepper suggested last March that perhaps a blockade of Colombia and the Bahamas might stem the flow of drugs to this country.

You responded by saying:

> I believe that properly resourced, assisted, and cooperated with by the United States, that the Government of Colombia would, in effect, attempt to put in a blockade.

You went on to say that a blockade of the Bahamas "sounds reasonable to me."

In your opinion, what would it take to implement an effective antidrug smuggling blockade of Colombia, the Bahamas or any other drug-source nation?

And is this something that is being considered by Southcom or the administration as an operation for stopping drug trafficking?

General GORMAN. The answer to the last question is clearly "no."

What would it take? I tell you not to do it. Don't do it the way we have been doing it where you put a few ships to sea and you stay out there for 30 or 40 days, because the traffickers just stop operations or suspend them, and the little guys who don't get the word from the top are the ones that get caught. The big fellows just wait it out and move back into operations or behind it.

It has to be a prolonged, concerted, careful effort, well supported by intelligence. Aimless steaming around out there is not what is called for here.

COMMITMENT OF SHIPS AND PERSONNEL

Senator PROXMIRE. How big a commitment of ships and personnel?

General GORMAN. I could not estimate that, sir. I would tell you that at any given point in time one-third of the Atlantic Fleet is down there. They are not pursuing this business. My contention is that they could be.

Senator PROXMIRE. I understand that operation Blue Lightning came close to a blockade against marine targets coming out of the Bahamas earlier this year and snared over 6,000 pounds of cocaine.

Is that the kind of blockade you think would be effective?

General GORMAN. Yes. Again, you have to keep it up.

Senator PROXMIRE. Thank you very much, Mr. Chairman.

Senator STEVENS. Thank you.

We will wind it up in 4 or 5 minutes.

Do you have some more questions, Senator Sasser?

Senator SASSER. Yes, I do, Mr. Chairman. I will try to be just as brief as I possibly can.

General, we discussed on the first round of questioning ways in which our Government and the military portion of our Government could be of assistance in trying to end the drug trafficking or seriously diminish the drugs flowing from South and Central America to the United States.

DESTRUCTION OF COLOMBIAN MARIJUANA CROP

The April 5 edition of the Christian Science Monitor, a distinguished newspaper, states:

> Last year in its drug battle Colombian officials destroyed more than 50 percent of the country's entire marijuana crop. The Colombians did this in part with the help of helicopters supplied by the U.S. Government.

Did the Southern Command assist the Colombian Government in this matter?

General GORMAN. No, sir.

Let me qualify that by stating that the Southern Command has had continuing dialog with the Colombian Armed Forces, the Ministry of Defense and with the major general who is in effect the senior police official in Colombia on the broad aspects of this problem.

One of the points that emerged from the dialog was that Colombia does not suffer from a shortage of helicopters or transportation in general. They have pretty much the wherewithal to do the job, but they are not very well organized to bring those sorts of assets to bear on the problem.

Part of the difficulty with the Colombians is that they have long since come around to the view that a helicopter is a mode of transportation for general officers, and trying to persuade them that maybe there is another way of looking at that was one of the contributions that I think we made to all of that.

But with respect to the specific operations to which you are referring, no, Southcom had no hand in that.

SABENA BATTALION IN COLOMBIA

Senator Sasser. The Colombians have a special military battalion, I am informed, the Sabena Battalion which is specially trained to combat drug traffic.

Did we assist in the training of that battalion?

General Gorman. That training was assisted by other agencies.

Senator Sasser. Agencies other than the DOD?

General Gorman. Right.

Let me point out, though, that most of the individuals in those units were trained at Colombian Lancero School, which is a carbon copy of our Rangers School down at Fort Benning, circa 1962 or early 1960's Ranger School.

In that respect, it has been fairly easy for the United States to relate to the Colombians because we did have that kind of common doctrinal base from which to proceed.

Senator Sasser. We did cooperate in the training of that battalion which is essentially an antidrug battalion which I think is a fine example of cooperation between United States and Colombian officials to combat this problem.

General Gorman. I would comment that if authorized to do so, we could be, the Department of Defense, Southern Command could be very useful, very helpful in the training of similar organizations elsewhere.

Senator Sasser. General, let me ask you another question.

DIPLOMATIC RELATIONS WITH BULGARIA AND NICARAGUA

You indicated a moment ago that the Government of Nicaragua along with the Government of Bulgaria and, perhaps, one other in your judgment appeared to make a governmental policy to engage in the shipment of narcotics or drugs internationally and Nicaraguan drugs obviously to be destined to the United States.

Do you think we would be justified in ending or breaking diplomatic relations with Nicaragua as a result of a governmental policy of putting drugs in the United States?

Senator STEVENS. I have to tell you I think you are going far afield from the jurisdiction of this committee.

Senator SASSER. Mr. Chairman, I know that, but I am not asking your views on this. This is a distinguished——

Senator STEVENS. You are here to ask views about interdicting narcotic smuggling.

Senator SASSER. I would like to have his views. If he does not wish to answer——

Senator STEVENS. We called him here for a hearing on what this committee can do about assisting in drug interdiction, not what the President of the United States ought to do.

Senator SASSER. That might have impact on drug interdiction, Mr. Chairman.

Senator STEVENS. I will recess the committee if you are not going to stick to what is the jurisdiction of this committee.

Senator SASSER. Is the chairman instructing the witness not to answer?

Senator STEVENS. I am.

We are going to stick within the jurisdiction of the committee. We are going to have hearings on subjects like this. That is all there is to it.

Senator SASSER. If the chairman is going to pass on questions of this matter——

Senator STEVENS. That is not within the jurisdiction of this committee.

Senator SASSER. General Gorman, I thank you for appearing today. I think it is unfortunate that you are not able to at least make your own judgment on what the relevant answers would be.

I have no further questions.

General GORMAN. Thank you, sir.

Senator STEVENS. General, we thank you very much. You are a distinguished general officer who has probably done, I think, as much as any man could do to try to stimulate some interest in the area that you had under your command.

We look forward to going back down there again this year. We are going to miss you when we are down there.

General GORMAN. You will find a very capable fellow in my stead down there. Jack Galvin will, I am sure, give you all you are looking for.

Senator STEVENS. Good.

Thank you very much.

SUBCOMMITTEE RECESS

[Whereupon, at 11:55 a.m., Tuesday, June 4, the subcommittee was recessed to reconvene at the call of the Chair.]

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